DECEMBER 6, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Metal Weds Plastic
a new material is born

✔ **PRICE RISE IN NICKEL**
What It Means to Users, p. 73

✔ **U.S. TOOL AUCTIONS COMING**
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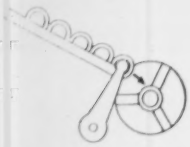
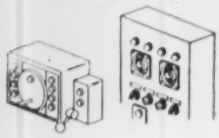
AUTOMATIC LOADING AND LOCATING IN CENTERLESS ROLLS



AUTOMATIC CHUCKING

AUTOMATIC LOADING AND LOCATING, CENTRI-MATIC



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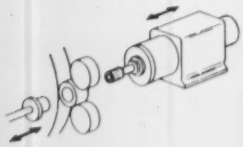

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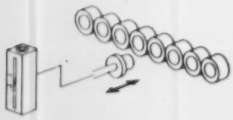

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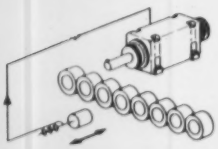

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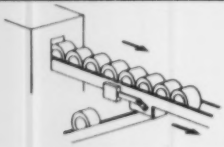

AUTOMATIC HANDLING AND SORTING

AUTOMATIC TRANSFER

Heald transfer-type Bore-Matic arranged for fully automatic drilling, reaming, boring and facing of valve seats and stem holes in automotive cylinder heads. Machine consists of a series of basically standard Heald way-leg units, sequentially machining the work through the various stations to the far end fully automatically.

Heald battery-type Internals permit fully automatic operation of a bank of machines from a single hydraulic power unit. One operator can easily tend several machines.

How Heald AUTOMATION fits into your production plans

AUTOMATION is the newest trend in modern production efficiency. Yet it has occupied the attention of Heald engineers for many years. In fact a number of important developments contributing to fully automatic operation were developed here at the Heald plant more than a decade ago. And research on automation has progressed unceasingly, as witnessed by scores of fully automated transfer machines, way-type Bore-Matics and battery type Internals now operating successfully in the field.

This background of experience is at your disposal – ready to solve virtually any precision finishing problem, carrying it through in many cases from rough casting to finished part. Your nearest Heald representative will welcome an opportunity to show you how Heald AUTOMATION can step up precision and production, with important savings in time and cost factors.

You'll find that IT PAYS TO COME TO HEALD!

HEALD

THE HEALD MACHINE COMPANY ®

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Meet the man who softens up the sheets

We're in the annealing room at Bethlehem's Sparrows Point sheet mill. Over there is Carl, the floorman, directing the furnace into position as he gets an annealing cycle under way.

Sheets come off the cold mill hard, brittle, virtually unworkable. Annealing gives them softness and ductility, through an appropriate cycle of temperature and time.

As floorman, it's Carl's responsibility to keep a close check on annealing schedules, make sure the right coil gets to the right furnace, see that it's loaded on the proper annealing base, and in the right position. He inspects the base fans to see that they are working perfectly so they'll circulate the heat efficiently through the furnace.

Details? Of course! But every last one must be handled just right, so that each batch of sheets gets the annealing the customer's requirements call for.

In handling his job Carl gets the stimulation any good man derives from the knowledge he's playing on a crack team. At both our Sparrows Point and Lackawanna plants, sheet-making operations, from slab-scarfing right on through to the shipping platform, are in the practiced hands of keen, quality-minded men. The steel they work with is top quality. The equipment they use to scarf it, heat it, roll it, pickle it, anneal and temper it, is second to none.

Good men, good steel, good equipment —that combination is bound to spell a good product. We'd rather not go so far as to claim that Bethlehem sheets are better than those our able competitors make. But this much we *will* say: that when you order Bethlehem sheets you can be sure of a product that, at the very least, will compare favorably with the best the industry is making. Sheets as finely finished, as easy forming, as true to gage, as any on the market. Sheets as fine as you can buy!

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BETHLEHEM, PA.

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BETHLEHEM STEEL

BETHLEHEM SHEETS

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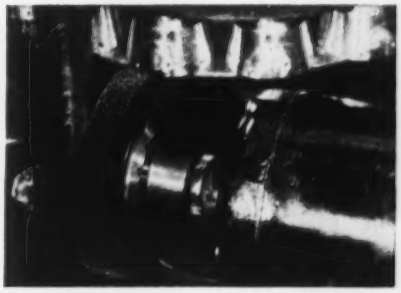
DIVISION OF PITTSBURGH STEEL FOUNDRY CORP.

Faster production with power brushing

Here's how you can get it in your plant

AN Osborn Brushing Specialist knows where power brushing fits into the overall production picture. In making an **O**sborn **B**rushing **A**nalysis, he studies all cleaning, finishing and burr removal operations. Then, he analyzes these operations and submits a written report that tells where power brushing could speed production or improve quality.

Such an analysis has resulted in big savings in many plants. It could do the same for you. There is no obligation for an **OBA**. Just call or write *The Osborn Manufacturing Company, Dept. G-26, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



4 TIMES FASTER. *Here, "push-button" brushing with Osborn Mastery Wheels removes feather burrs at a rate of 1400 parts an hour. By former hand method, output was 360 per hour. An* **OBA** *can help speed your production, too.*

OSBORN

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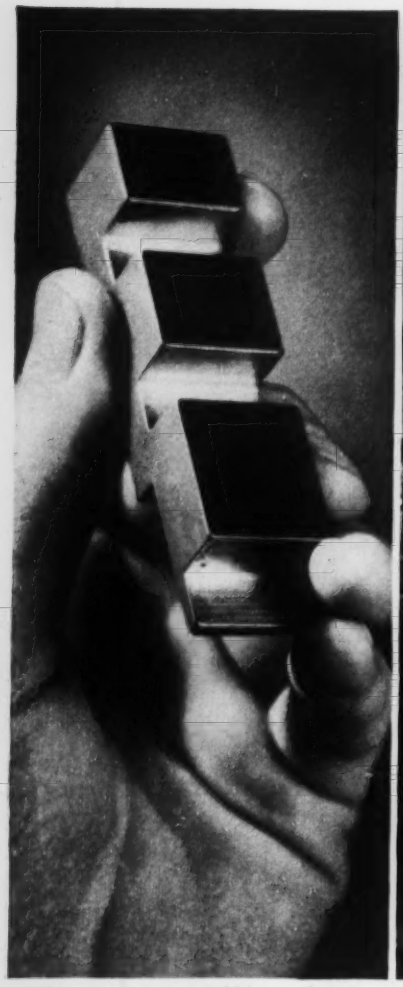

This part once cost 21½¢ per piece to finish. The manufacturer investigated barrel finishing and decided to give it a trial.

This method — barrel finishing — proved a sensational cost cutter. The medium is Norton ALUNDUM* Tumbling Abrasive. The cost per finished part today is 5½¢!

This abrasive, a typical Norton finishing development, is sharp, dense, hard and non-fracturing. Its blocky shape eliminates slivers and chips in the process.

Cost on this piece cut 75% with barrel finishing abrasive

"TOUCH of GOLD" *enjoyed as Norton ALUNDUM Tumbling Abrasive goes to work*

This finished part tells the story in a jiffy.

Once the work entailed "hand-deburring" at a cost of 21½¢ per piece. Now barrel finishing with Norton ALUNDUM abrasive does the job and the cost is 5½¢ per piece.

Besides the savings, these other advantages were also gained: ***Uniformity of radii and surface . . . Brighter color . . . Smoother finish.***

Are you taking advantage of Norton ALUNDUM tumbling abrasive in your work?

See your Norton Distributor for further facts. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in the yellow pages of your phone book. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. G-280

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

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and its BEHR-MANNING division

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BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 135 No. 23 December 6, 1954

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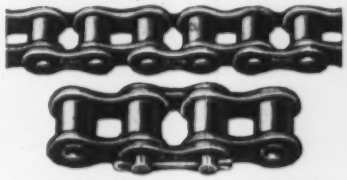
are custom made for STRENGTH DURABILITY

COMPLETE PRODUCTION FACILITIES AND PROMPT DELIVERY ON ALL THESE CHAINS

Plus engineering service when required



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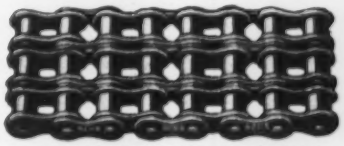
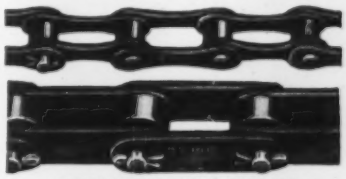
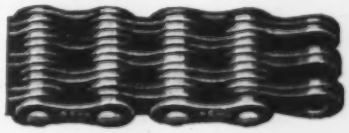
Available in pitches from ⅜" to 2½" riveted and detachable type.



STANDARD MULTIPLE WIDTH
Multiple widths of six strand or wider available for special application.



DOUBLE PITCH CHAIN
For use in slower speed power transmission and material handling conveyors.



CABLE CHAINS
Acme Cable Chains are furnished in a variety of pitches, widths and strength.

SPROCKETS
Acme Sprockets are available in a wide range of sizes, in all types.

Write or Phone Holyoke 2-9458

Write Dept. 10-P for new illustrated 76 page catalog on use and application of roller chains and sprockets.

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HOLYOKE MASSACHUSETTS

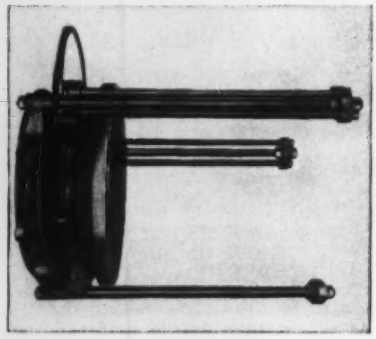
(Advertisement)

Gas Main Safety

Bailey Thermal Expansion Goggle Valves form tight, leak-proof seals to close mains from 36" to 120" in diameter

AN UNFAILING force of nature—the linear expansion and contraction of steel—is being used to increase steel mill safety. The larger sized gas mains are closed safely and efficiently by Bailey Thermal Expansion Goggle Valves. In them the powerful force exerted by the linear expansion of three steel tubes is used to free or clamp the goggle plate—providing an absolutely gas-tight seal.

In operation, steam is passed into the tubes, which are spaced evenly around and perpendicular to the rigid steel flanges of the valve. The resulting expansion frees the heavy goggle plate



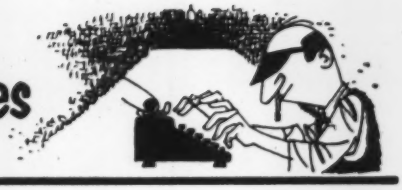
Bailey Thermal Expansion Goggle Valves are produced in diameters from 36" to 120".

so it may be swung to the open or closed position. When the steam is shut off, contraction of the tubes takes place, closing the flanges tightly against the goggle plate. Since both sides of the plate are machined to conform to the machined edges of the valve flange, Bailey Valves are leak-proof in both open and closed positions.

Sound design and precision manufacture are combined in these valves to assure the ultimate in safety and reliability. They have been thoroughly proved on the gas mains of blast furnaces, gas washers and boiler plants. Bailey Thermal Expansion Goggle Valves are completely dependable in hot or cold, dirty or clean gas mains.

WILLIAM M. Bailey COMPANY
1221 Banksville Road
Pittsburgh 16, Pa.

behind the scenes



Ship Ahoy, Mate

A young seadog we know tells this story on himself. George (we'll call him that, because his name is George) is employed by the Hanna Coal & Ore Corp. as a 2nd mate. Competent and responsible, he is in great demand by the Hanna skippers, and over the years he has piloted all the ships of the Hanna and National Steel Corp. fleets—all the ships, that is, except the two new giants: the Ernest T. Weir and the Joseph H. Thompson. George had heard that those speedy monsters devoured pilots, and that three or four 5-day round trips frequently aged Great Lakes seamen before their time. Every time he sensed a transfer, he managed to bypass assignments to the mighty Weir and the even mightier Thompson.

To the landlubbers reading this, we might mention that these two ships, moored stem to stern, would measure almost a quarter of a mile in length and their combined cargo would be close to 38,0000 tons. You might contrast this with the first ship to sail Lake Erie, La Salle's Griffin; it was a bark of 60 tons, and its cargo was a few bales of skins.

Luxury On The Lakes

Well, George came ashore recently when the ships began tying up for the winter. He sailed his cap into the corner, greeted his wife and daughters, brushed a cloud of iron ore from his hair, and prepared to relax until spring. He has no plans other than to hold a shore job, cut down about a dozen trees, move the garage, remodel the house and maybe build a TV set.

"I'm glad I ain't rolling across Lake Superior in the big Weir," he grinned, bracing against the cold wind. "It's good to be ashore now and then, where you can find your way around without a compass."

Right now he's glad he has access to a compass—and radar, and radio beams, too, because before he could begin to relax he was recalled by the Hanna Company and assigned to the Ernest T. Weir until layup time. But here's where the joke comes in. Last week he called his wife from Detroit, and asked her to excuse the holes in his head. The Weir, he said, was the most magnificent ship he had ever sailed. Officers' quarters were superior to swank hotel rooms; the floors were carpeted, there was an inside stairway to the pilot house, the appointments were breathtaking, and the ship itself was a sweetheart.

"Discount all that stuff I told you about the big ships," he told his startled wife. "If you know anybody who can pull strings, pull 'em, because from now on I'm sold on the monsters!"

A Marriage Of Convenience

New York Editor Sam Baker compels our attention this week with an exciting article on short cuts to finished products, new laminates combining the protection and appearance of Vinyl plastic with the rigidity and formability of steel. Sam tells us that the cost will soon be down to about 20c per square foot, and that you can do anything to it that you can do to metal, except weld, braze or solder it.

The article reveals that the Naugatuck Chemical Division, U. S. Rubber Co., and O'Sullivan Rubber Co. all had a hand in the development of this extraordinary marriage of plastic and metal. The process is secret (you can't blame the boys for wanting to make an honest buck) but the material is available; it can be used in hundreds of applications: luggage, bathroom tile, cabinets, building supplies, office equipment, siding, cans, etc. If you study Baker's article it's ten to one you'll do some strong thinking about this new and useful economic material.

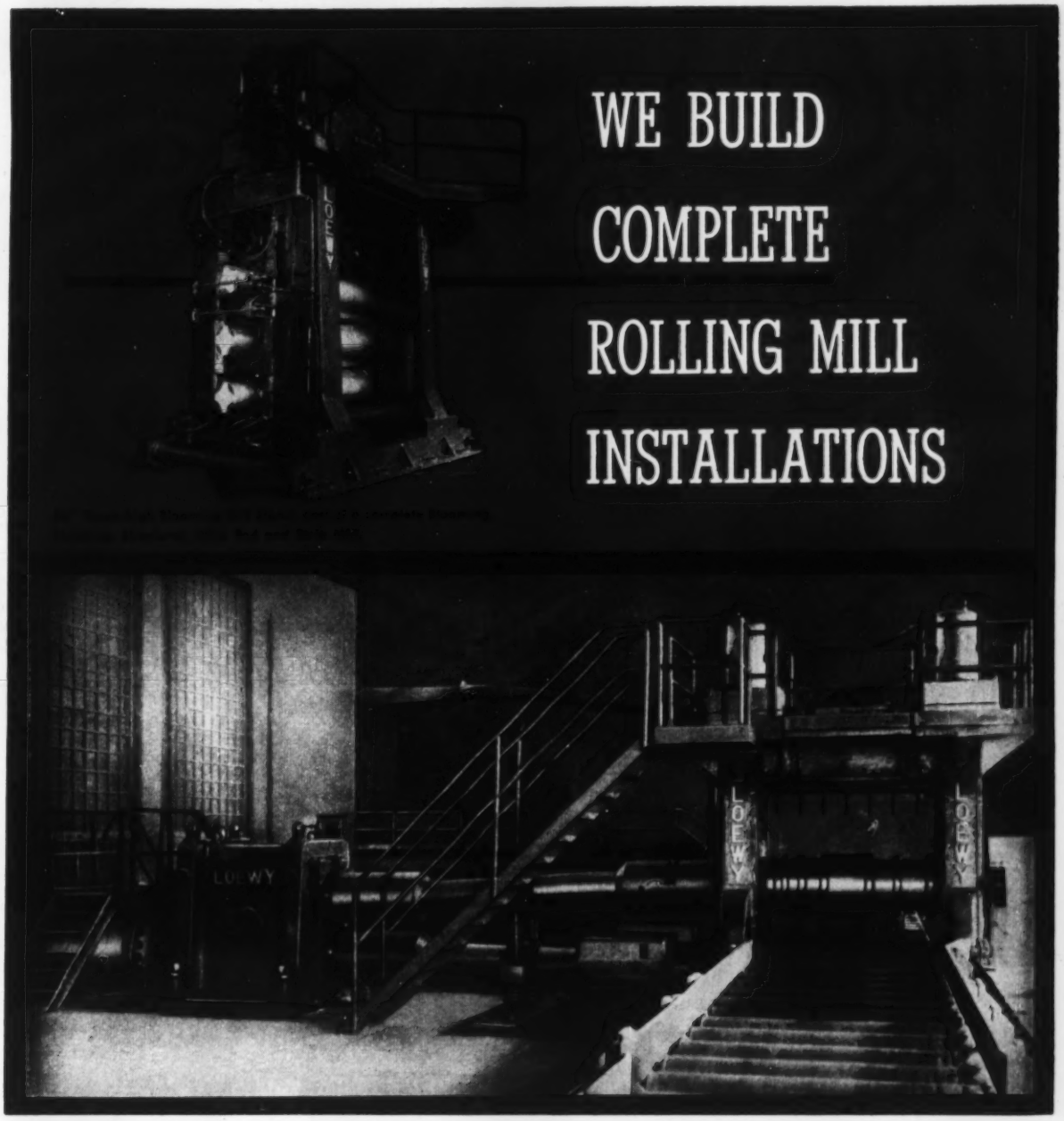
Ye Publishing Paradox

Behold, ye magazine ith odd:
Ye Adertiser payeth
For what he says, whereas ye Ed
Ith paid for what he sayeth!

Shrdlu

Metalworking Outlook—page 65

WE BUILD COMPLETE ROLLING MILL INSTALLATIONS



26" Two-high Blooming Mill, part of a complete Blooming, Slabbing, Structural and Strip Mill Installation.

THREE-HIGH OR TWO-HIGH BLOOMING MILLS
CONTINUOUS STRIP MILLS • SPECIAL MILLS
CONTINUOUS MERCHANT AND WIRE-ROD MILLS
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For a realistic answer to the metal stamping and forming problems of today... and tomorrow

DESIGN MODERNIZATION CONCEALS DRIVING MECHANISM

Fully streamlined, enclosed construction, front and back, provides pronounced advantages. There are no exposed, overhanging flywheel, clutch, brake, intermediate shaft, nor motor in rear of press to obstruct crane service, block light, throw grease and consume floor space unnecessarily ... yet all parts are quickly accessible.

WORK-SAVING FLEXIBILITY MEETS SHIFTING PRODUCTION NEEDS

Box type welded steel slides are power adjusted through self-locking, worm driven, barrel type connections to accommodate a wide range of die heights and to permit quicker, easier and safer die setting. Niagara electric clutch control provides trouble-free push button operation and a five-position selector switch for ease, safety and efficiency in single stroking, continuous running, jogging, reverse jogging and slide adjustment.

RUGGED, HEAVY DUTY FRAMES PROLONG DIE LIFE

All-steel, rigidly constructed frames, featuring an exclusive triple box section design, provide maximum resistance to deflection from horizontal, diagonal and torsional stresses. Greater accuracy and longer die life are thereby assured.

GREAT SHUT HEIGHT AND LONG SLIDE ADJUSTMENT

Unusually liberal shut height and extremely long slide adjustment, of both one and four-piece frame construction, permit use of a tremendous range of stamping and forming dies.

Hailed as the most progressive step in straight side, double crank press history, the new Niagara SC-2 Press Series could only have originated from a keen insight of today's metal working problems and the more challenging ones of tomorrow. In every detail of design, you'll recognize the unduplicated competence of Niagara engineers. Who else would be more mindful of press users' needs than the men who design and build America's leading and most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work?

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Preview this complete new line of straight side presses at once. Find out what they can do for you. Write for Niagara's new, illustrated Bulletin 64-H today.

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Manufacturers of Phillips head and other precision cold headed parts know a good thing when they *see the production records*!

In plants where Keystone "Special Processed" Wire is on the job, output per machine, per man, per hour has increased. Die life, for example, is often more than doubled — which in turn decreases machine down time and labor costs. A higher quality end product with its lower rejection rate helps place the per unit cost on a much more profitable level.

The superior grain flow characteristic of "Special Processed" Wire, together with its structural soundness, give this wire unsurpassed performance on any unusually difficult cold heading job. For further information, contact your Keystone representative or write direct.

LETTERS
TO THE EDITORS

Leaded Steel Magic

Please send me five tear sheets of the article in the Oct. 25 issue, p. 150, "Adding Lead to Steel . . . Here's How It's Done." (Here, for the first time, details of the process are revealed.)

Everett S. Hoff
production manager
Columbia Steel & Shafting Co.
Pittsburgh

We would appreciate your forwarding four tear sheets to the undersigned . . .

H. P. Barringer, assistant manager
Quality Control Department
Steel Division
Ford Motor Co.
Dearborn, Mich.

Please send me six tear sheets . . .

W. R. Brown
metallurgical engineer
Titan Metal Mfg. Co.
Bellefonte, Pa.

• *Sent.—ED.*

Expansion Story for FTC

If available, please send two tear sheets of your article, "Coming: Another Wave of Steel Expansion" (Planning departments in major steel companies are busy . . .). The article appeared on p. 111 of the Sept. 20 issue.

Earl A. Graham, economist
Federal Trade Commission
Bureau of Economics
Washington 25

• *Sent.—ED.*

Putting the Shine on Appliances

On p. 59 of the Oct. 18 issue there is the article, "Porcelain Enameling Forms Beauty Skin for Home Appliances." It refers to porcelain enameling used by Frigidaire Division, General Motors Corp., on which we would like to get further information.

Tom T. Sasaki
Sasaki Welding Shop
Honolulu, Hawaii

• *Write to C. Carlton Brechler, director of public relations, Frigidaire Division, General Motors Corp.—ED.*

Aid to Heat Treating

Reference is made to a new device that has been developed for measuring surface temperature of steel undergoing induction heat treating in your story, "Induction Heat Treating . . . Selectiv-

(Please turn to page 12)

PRODUCTION UP...COST DOWN!

on TRANSMISSION REAR BEARING RETAINERS

...AT 85% EFFICIENCY

27 PARTS per HOUR

DRILLED, REAMED, SPOT-FACED and TAPPED on a

NATCO

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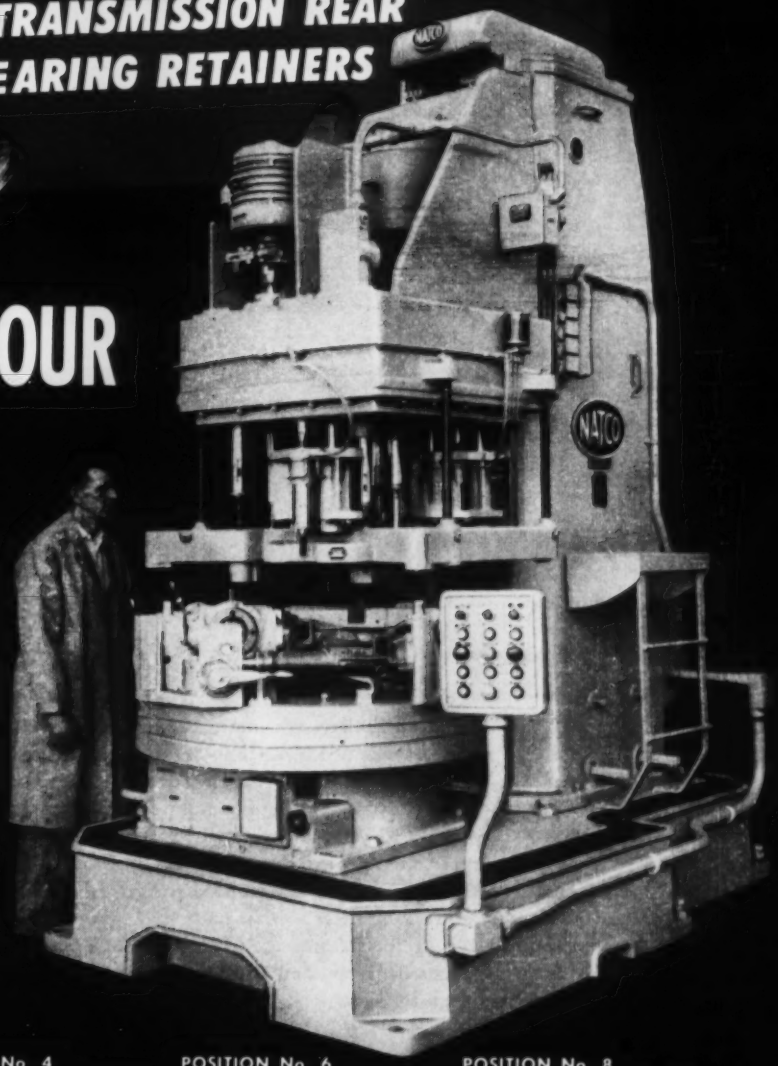
HOLESTEEL

COMBINATION

DRILLER and TAPPER



The machine is provided with a 4-position fixture, mounted on an 8-position indexing table, and arranged to accommodate 2 parts in different locations in each position while performing the following operations:

POSITION No. 1
Remove and load 2 parts

POSITION No. 2
Location "A," Drill 1 hole
Location "B," Idle

POSITION No. 3
Location "A," Ream 1 hole
Location "B," Idle

POSITION No. 4
Location "A," Drill 1 hole
Location "B," Idle

POSITION No. 5
Location "A," Combination spot-face 2 holes
Location "B," Combination drill, countersink 2 holes

POSITION No. 6
Location "A," Combination finish spot-face 2 holes
Location "B," Tap 2 holes

POSITION No. 7
Location "A," Combination align ream 2 holes
Location "B," Idle

POSITION No. 8
Location "A," Tap 1 hole
Location "B," Idle

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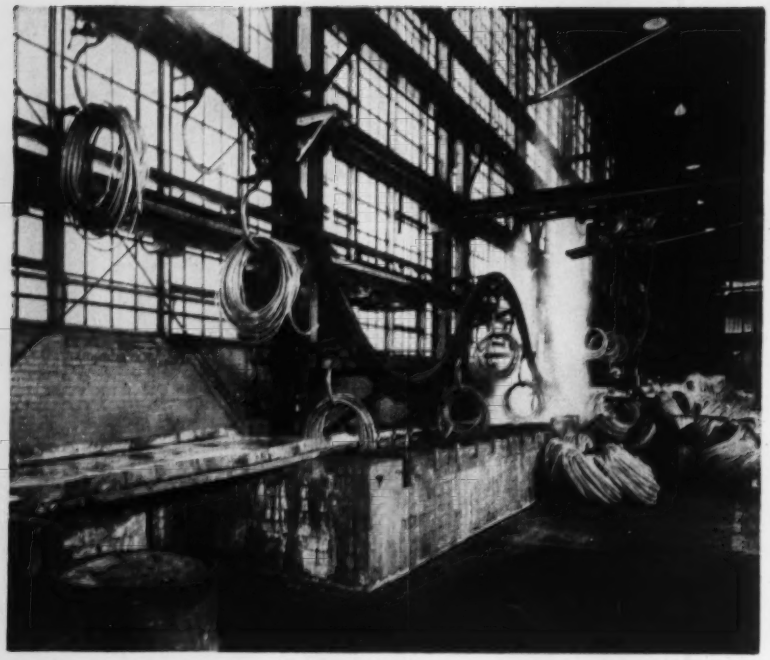
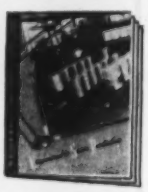


OVERHEAD TROLLEY CONVEYORS

one of the many types of high-quality power and gravity conveyers in the MATHEWS Line

Overhead Trolleys are among the most frequently applied types of power conveyers. They are used to serve processing machines, move material from one area to another, take components through painting, drying and enameling operations, and are, in fact, an extremely versatile type of equipment. Trolley Conveyers can be lowered, through the use of transverse bends, to working areas so that parts may be placed or removed from hooks or trays. They are used for storage conveyers, holding materials until needed and saving valuable floor space for production machines.

• Write for catalog HB53 for complete details of Trolley Conveyers and for other types of Power Conveyers and Special Conveying Machinery, or for Catalog No. 853, featuring numerous installations that might help you with your conveying problems. Both catalogs are yours for the asking.



MCC **MATHEWS CONVEYERS**

GENERAL OFFICES . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIVISION . *Mathews Conveyer Company West Coast*
SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

LETTERS

(Concluded from page 10)

ity Teams Up with Versatility" on p. 92 of the Oct. 28 issue. We would appreciate more information about that device

Mortimer C. Bloom
acting head, Corrosion Branch
Metallurgy Division
Naval Research Laboratory
Washington

• *That device is the Rayotube, developed by Leeds & Northrup Co. For more information write to that company at 4901 Stenton Ave., Philadelphia 44.—ED.*

Well-Covered Subject

This morning I happened to see in the Nov. 22 issue on p. 48, the excellent article, "Patent Board Offers Inventions to Industry," in E. C. Kreutzberg's "Windows of Washington" column.

Please permit me to thank you for the comprehensive and specific coverage of the subject in Mr. Kreutzberg's article. May we have two copies of that issue?

William A. Adams
assistant to the Chairman
Government Patents Board
Washington 25

• *Sent.—ED.*

Congressmen See Seaway Story

The staff of the Legislative Reference Service has found a recent article appearing in STEEL to be unusually helpful in answering requests made of us by members of Congress. The article was entitled, "The St. Lawrence Seaway: New Channel for Business," which appeared in three parts in the May 24, May 31, and June 7, 1954 issues. I am writing in hope that tear sheets of that study may be available.

Charles A. Goodrum
Legislative Reference Service
Library of Congress
Washington 25

• *Enclosed are 12 sets of tear sheets. Unfortunately, that exhausts our supply. —ED.*

Glass Protection for Metal

In the "Technical Outlook" (Nov. 15, p. 127) you had an article on a new silicate coating for giving glass-like protection to steel. We are interested in getting further information on that material as a possible protective coating for our steel hot-galvanizing kettles.

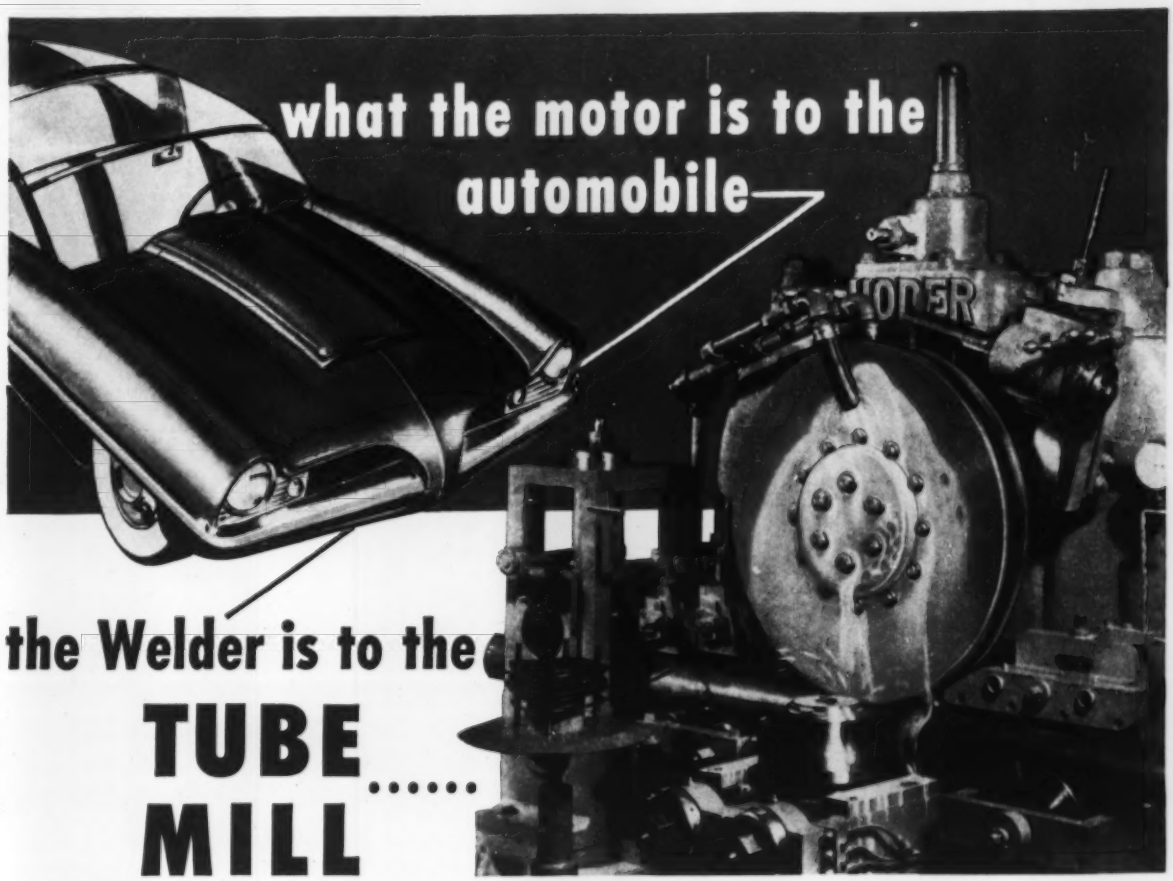
George C. Price
president
Electrical Mfg. Co.
Battle Creek, Mich.

• *Write to Allied Products Inc., 851 S. Market, Waukegan, Ill.—ED.*

Once a Reader, Always a Reader

During my six years in the steel industry, I came to know the value of the articles published in STEEL Magazine. I was interested to hear recently, therefore, that you had published an article, "Product Diversification: Five Roads to Greater Profits," No. 8 in STEEL's 1954 Program for Management (Sept. 13, p. 113). I am now working in the market research department of a manufacturer outside the steel industry, but I would appreciate receiving a copy of that article.

Richard J. Mauthe
Kendall Co.
Walpole, Mass.



the Welder is to the TUBE MILL.....

Both footage and tonnage-wise, electric-weld tube production depends, above all else, on the welder.

Much of the credit for the high production and rapidly growing demand for electric-weld pipe and tubing goes to notable advances in tube welders introduced by Yoder.

First came the Yoder welder incorporating their revolutionary rotating transformer. Then the present Four-in-One welding transformer —most compact, trouble-free and efficient resistance welder yet known.

More recently, Yoder has perfected mills for *induction welding of steel pipe* and tubing, at speeds up to 250 f.p.m., using hot rolled, unpickled strip, at a substantial cost saving.

For *aluminum, brass, nickel, monel* and other non-ferrous metals, Yoder also has pioneered the development of a new high-speed electric induction tube welder.

These developments—all Yoder Firsts—afford profitable new opportunities for pipe and tube manufacture. Incidentally, they also account for the overwhelming preference for Yoder tube mills among electric-weld pipe and tube producers.

Literature, consultations and estimates without cost or obligation.

THE YODER COMPANY • 5502 Walworth Avenue, Cleveland 2, Ohio

Complete Production Lines

- ★ **COLD-ROLL-FORMING and auxiliary machinery**
- ★ **GANG SLITTING LINES for Coils and Sheets**
- ★ **PIPE and TUBE MILLS-cold forming and welding**

ENGINEERING YODER MANUFACTURING

NEW-NEW-

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HORIZONTAL, BORING, MILLING and DRILLING MACHINES

Model 75

with improved features for increased production and efficiency, ease of operation and maintenance, greater rigidity, flexibility and capacity.

- **PENDANT CONTROL** — Exclusive Bullard design for complete machine control from a movable pendant station. Feed and speed rate selection, directional feed and traverse engagement of the spindle, head, table and saddle, spindle rotation, and operation of head binders are accomplished from the Pendant. Interlocks and a stop-all stick provide safety for both operator and machine.
- **SCREW AND RACK FEEDS** — to the spindle provides smooth, steady power feed for boring and sensitive hand feed for small drilling and tapping.
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- **OPTICAL MEASURING EQUIPMENT** for head and table (optional).

NEW NEW

Available in 3, 4 and 5 inch spindle sizes, the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75, is engineered to meet industry's present-day and future production requirements as it embodies the most modern machine design principles and techniques.

For the complete story use this coupon for your copy of the new catalog.

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286 Canfield Avenue • Bridgeport 2, Connecticut

Please send me a copy of the new Bullard Horizontal Boring, Milling and Drilling Machine, Model 75, Catalog today.

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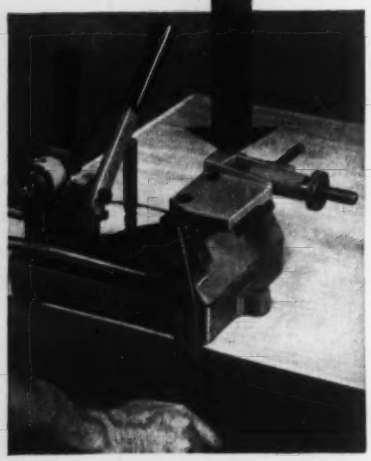
make Springs in Seconds!



Save Costly Special Orders With the NEW

DI-ACRO* Spring Winder

This unique machine eliminates costly special spring orders, saves valuable waiting time. Winds flat, torsion, compression and extension springs to 1½" O.D. Handles round, flat and rectangular wire to ¼" dimension. Note exclusive features in the hand operated Di-Acro Spring Winder which assure accurate tension and fast operation without special experience or skill.

new **TENSION CONTROL**—Simply adjust to desired tension—the control keeps it uniform, for winding one spring or hundreds, and releases when each spring is wound.

new **WIRE CUT-OFF**—After spring is wound, release tension and use cut-off lever to quickly cut end of spring to desired length.

new **CAM LOCK**—Simply feed wire under cam, turn handle and wire is securely locked to arbor while spring is wound. No threading required.

FREE ENGINEERING SERVICE

Extension Compression Right Hand Left Hand Torsion

Send us your spring forming problems — samples or dimension sketches—together with sufficient test material, and let us wind some sample springs for you free of charge. No obligation.

32-Page Catalog gives complete details on all Di-Acro Precision Machines—Spring Winders, Benders, Brakes, Shears, Press Brakes, Punch Presses, Notchers, Rod Parters, Rollers.

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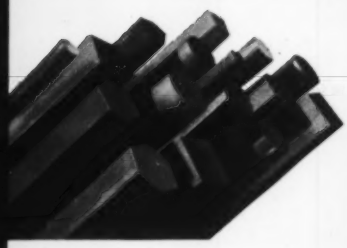
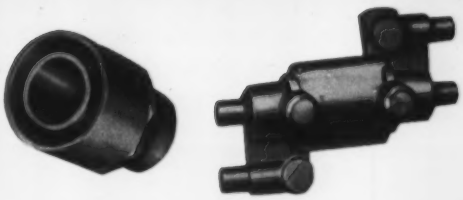
Brass and Bronze Free-Cutting Rods



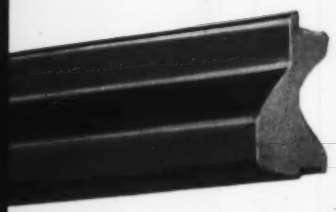
Furnished in all sizes from 1/16" for small-diameter rods up to 10" for cast and turned rounds. The most easily-machined of all metals and alloys.

Brass and Bronze Forgings



From 1/4 oz. to 100 lbs. in weight. Produced to meet requirements of uniform dimensions, finish and physical properties.

Extruded Brass Shapes



Squares, hexagons, half rounds, half ovals, and special shapes. Extruded-only rectangles furnished up to 3 1/2" maximum diagonal. Extruded, drawn, machine-straightened hexagons up to 4", rectangles up to 3 1/2" maximum diagonal.

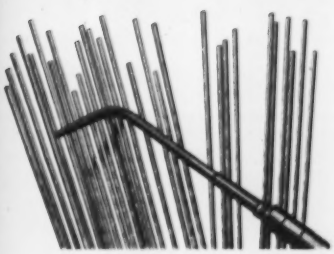
Brass Pressure Die Castings

Parts having thin sections and intricate cored parts readily produced. Titan die castings have better finish, stronger structure and greater accuracy than sand castings.

Titan Brass and Bronze Products

Titan brass and bronze products are supplied in analyses to meet every requirement. Write for descriptive catalogs.

Bronze Welding Rods



Eight different types meet all requirements. Titan's exclusive Double Deoxidation process assures ductile, high-strength, non-porous welds with the oxyacetylene torch.

Brass Cold Heading Wire

Brass wire for manufacture of rivets, bolts, screws, fasteners, etc.

Titan

METAL MANUFACTURING COMPANY

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Whether you use Argon by the Cylinder...*or by the* Truckload

you can be sure of your gas supply with LINDE Argon (99.99% pure)

Trade-Mark

Be sure that you can always get your supply of argon when you need it, wherever you want it and of the quality and in quantity you require. LINDE's many strategically located plants can be counted upon to provide all the high purity argon you need either as a gas or in space-saving liquid form. Bulk quantities of liquid argon are delivered by truck (see illustration) and either immediately converted into a dry gas and compressed into cylinder storage units or stored as a liquid and automatically gasified as it is used.

LINDE argon is guaranteed to be at least 99.99% pure to give extra protection against contamination in your metallurgical or other gas shielded applications. And, in addition, you can call upon LINDE Engineering Service to help solve tough production problems when time means money.

Call your nearest LINDE Office today for more information on how LINDE argon . . . plus LINDE Engineering Service can help you increase your production and profits.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

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The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

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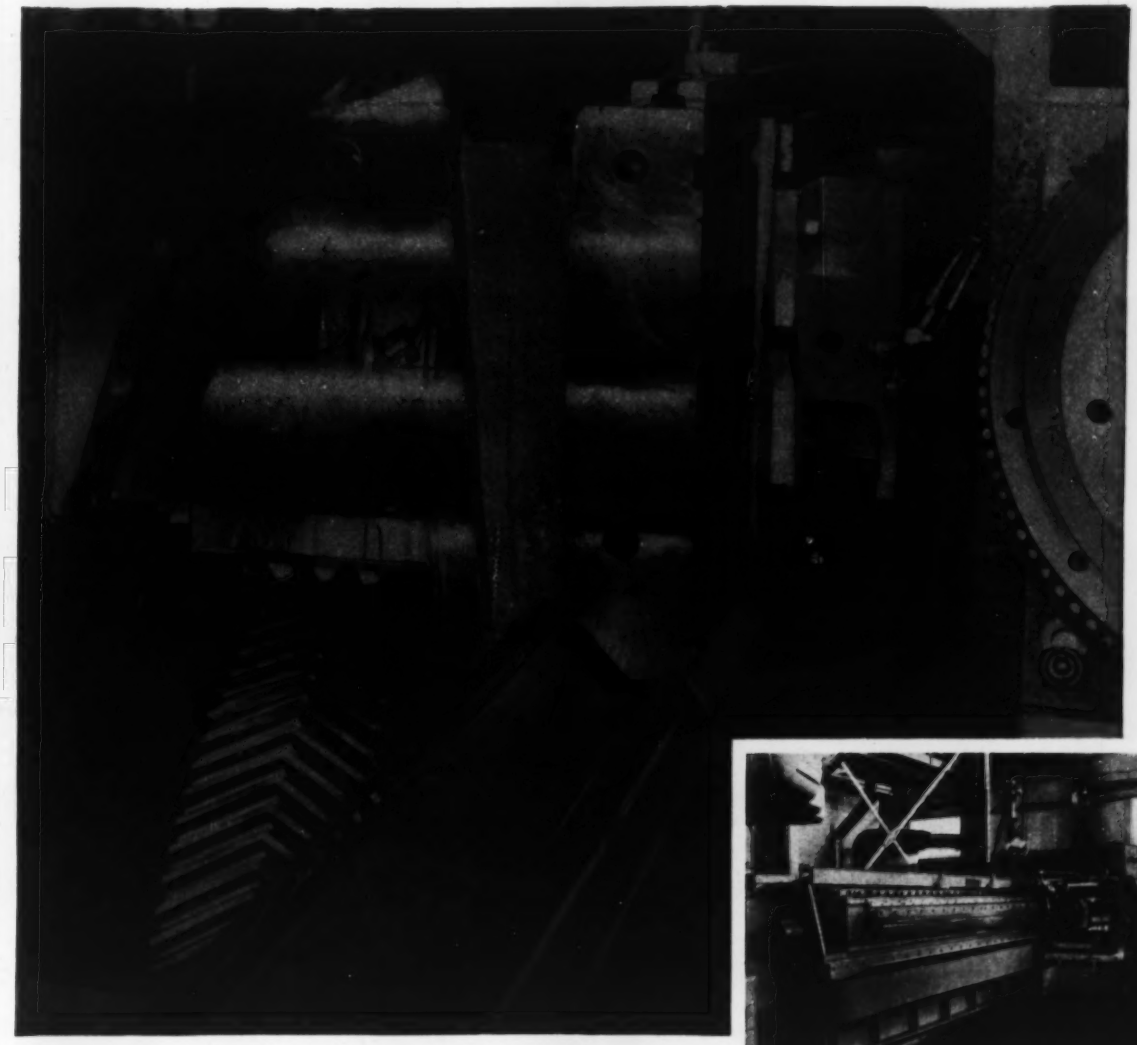

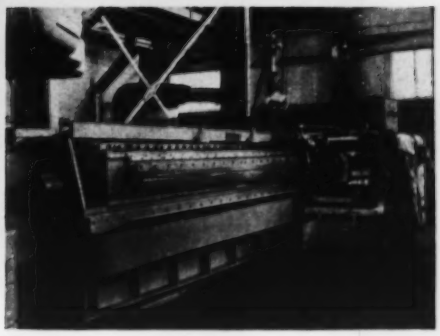

300 FPM Lapointe broaching machine has Farrel® herringbone rack drive

The Lapointe horizontal and vertical broaching machines, with electro-mechanical drive, are outstanding developments in broaching. The horizontal machine shown here is capable of broaching many jobs heretofore impossible, at speeds up to 300 FPM and more.

Farrel continuous tooth herringbone rack and gears drive the main slide. The quiet, vibration-free performance of this drive, which results from extreme accuracy of tooth spacing, contour and helix angle, is an important factor in attaining broaching smoothness at these high speeds.

Farrel herringbone gears are made of the finest grade materials, in any size from ¼ inch to 20 feet in diameter. Also available are straight tooth and single helical gears in sizes up to 20 feet diameter, and internal gears with either spur or helical teeth up to 16 feet diameter.

A Farrel engineer is available for consultation at your convenience, without obligation.

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Farrel-Birmingham ®

FB-905

2 Lectromelt arc furnaces compete successfully with openhearths—

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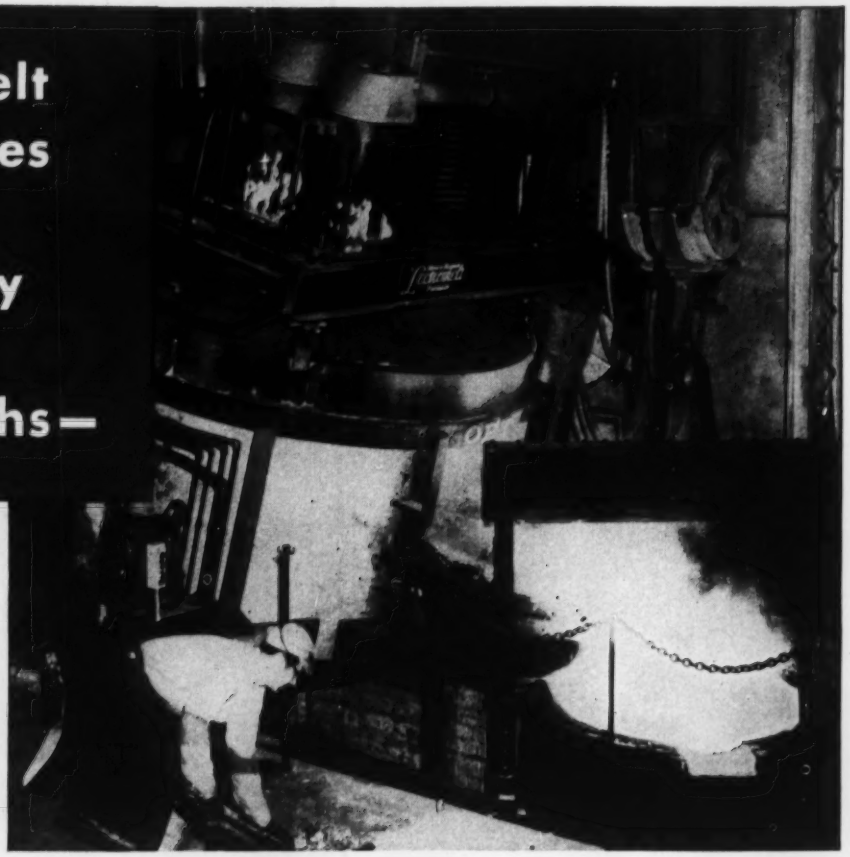


Manitoba Rolling Mill's new OPT Lectromelt is rated at 4½ tons per hour. It is ideally suited for making steel ingots for structurals, rounds and reinforcing bar produced by Manitoba.

Melting carbon steels

There's no question about the high quality of Manitoba Rolling Mill steels. Their two Lectromelt* Furnaces give them power to control temperature and analysis exactly. They meet order specifications easily. And they can duplicate specifications over and over again . . . even if orders require special alloying.

Melting is fast and precise in a Lectromelt Furnace. Down time is minimized because very little maintenance is required. Top-charging saves even more time . . . conserving power, furnace lining, electrodes and labor. What's more, when the workday is over a Lectromelt can lie idle all night without costing a penny.

Lectromelt's power supply and power regulation equipment is engineered specifically for each installation, assuring satisfactory operation. For top-charging, the roof lift and swing mechanism is separately mounted. Tilt mechanism is side mounted. Lectromelt's reduced inertia electrode mechanism gives you better control of electrodes.

A new Lectromelt could be your answer to improved plant efficiency. To obtain Lectromelt Furnace Bulletin No. 9, or to discuss the engineering or any characteristic of Lectromelt melting, smelting, refining or reduction furnaces, write Pittsburgh Lectromelt Furnace Corporation, 323 32nd St., Pittsburgh 30, Pa.

Manufactured in . . . GERMANY: Friedrich Kocks GMBH, Dusseldorf . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF

WHEN YOU MELT... MOORE RAPID *Lectromelt*

here's the key to a

SUCCESSFUL MAINTENANCE PROGRAM

THE REMINGTON RAND KARDEX record combines in a single pocket the complete history of the machine, machine characteristics, repetitiveness of repairs and a record of maintenance service and costs.

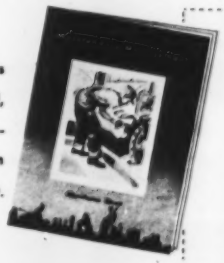
Through the use of colored signals the preventive maintenance program is visibly signalled, allowing you to analyze your preventive program at any time *in a matter of seconds.*

You will also need an inventory control system for spare parts. An effective stores control system is as important to your maintenance control program as is your work force. Without proper inventory control of parts, valuable production will be lost and machine down time increased.

Both of these records are shown in our booklet on Maintenance Management. This booklet also contains information on how to:

1) Keep Within Your Operating Budget
2) Reduce Emergency Work Through Planned Maintenance
3) Schedule Man-Hours and Cut Idle Time

send today for this 8-page booklet which shows in detail, in flow-chart form, how you can streamline your whole maintenance operation at the lowest clerical and equipment cost.



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Room 2255, 315 Fourth Ave., New York 10

Kindly send your free booklet "Assured Equipment Productivity Through Maintenance Management"-X1383.

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CINCINNATI accurately

1/2" plate and 20 gauge sheets

...without changing knife clearance

. . . You do not change knife clearance for successful shearing of different thicknesses on a Cincinnati. Just set the clearance for the thinnest material and shear all thicknesses up to capacity. Thousands of Cincinnati Shears are used continuously in this manner. This practical method prevents accidental damage — saves time. Remember, changing knife clearance interrupts production.

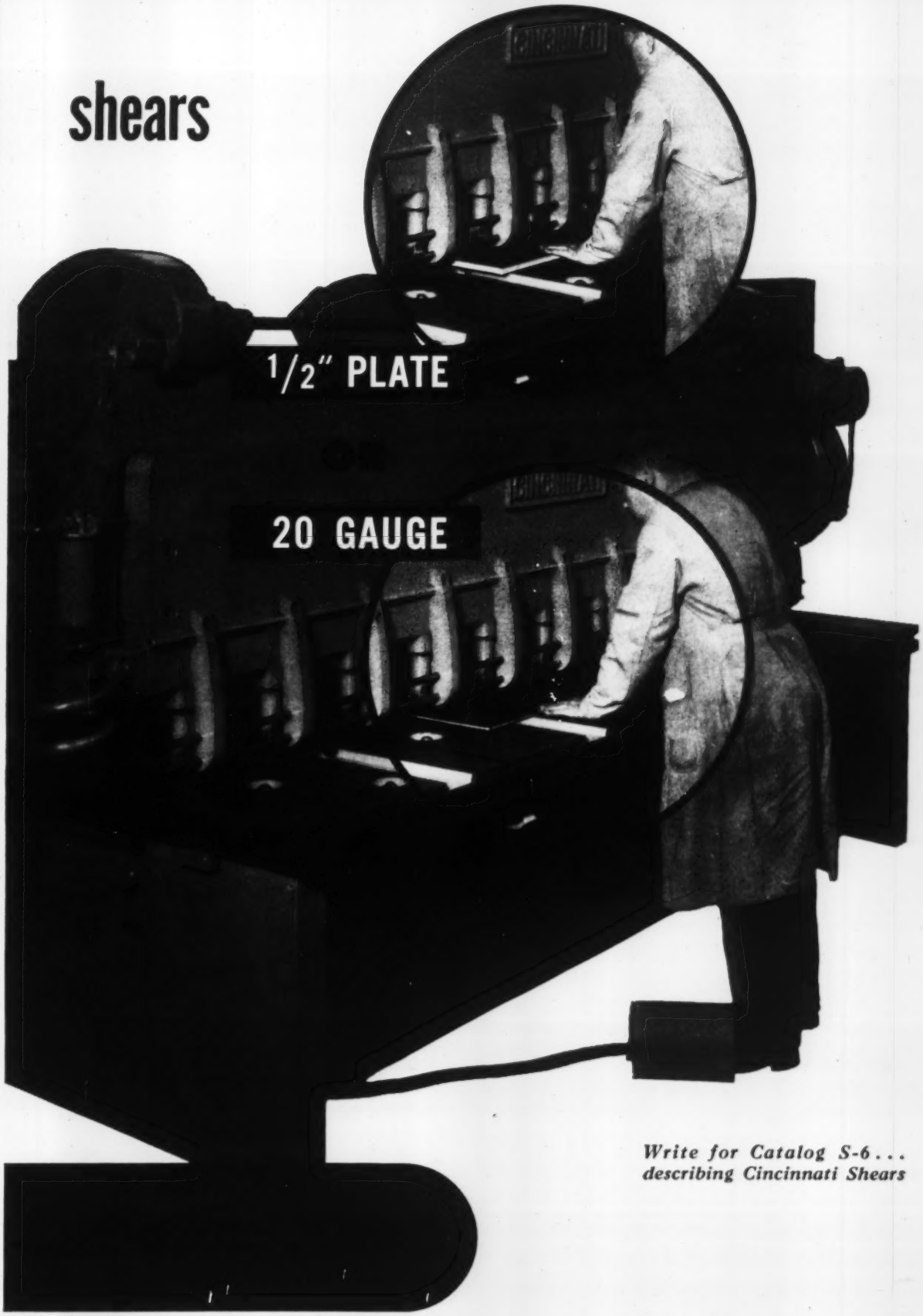
Sharp knives are a necessity for satisfactory shearing, especially on very light gauges. Remember, changing knife clearance does not sharpen dull knives. We suggest you write for data sheet on knife life.

CINCINNATI

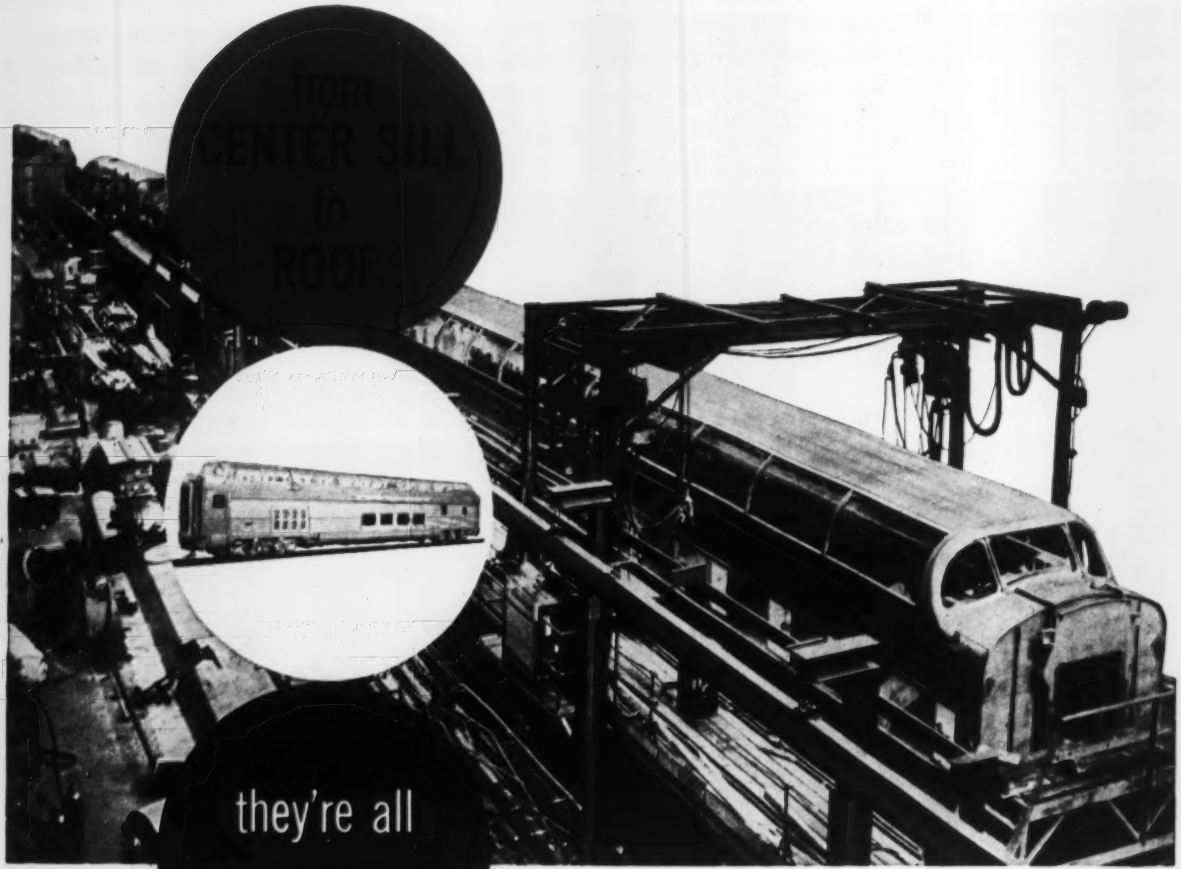
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

shears



Write for Catalog S-6...
describing Cincinnati Shears



These full-length dome cars are part of an order for 121 being built by The Budd Company for the Santa Fe Railway. They feature not only unexcelled facilities for passenger enjoyment . . . but also the *safety and economy* of Crucible Rezistal® stainless steel.

Because they're *all stainless* — their strength-weight ratio is higher than you'd find in low alloy carbon steel. The cars are *lighter yet stronger* than ordinary steel cars, which means the Santa Fe will be able to haul as many as 25 of these cars with the same drawbar pull they'd need for 20 low alloy carbon steel cars.

What's more, the passive surface of Crucible stainless will never need painting . . . never need more than a "once-over-lightly" by maintenance crews to keep its sparkling new look. And, beneath the skin, where corrosion and vibration can undermine the strength of vital structural members — the high corrosion resistance and fatigue strength of Crucible stainless will keep these cars in service for a lifetime.

Budd would not have chosen stainless for all the cars they build unless it was a *practical shop metal.* And it is. For it can be formed, machined, welded, drawn, heat-treated — processed in any way you'd normally use for ordinary steel.

So don't forget the Crucible family of stainless steels where you need corrosion resistance . . . high fatigue, creep and structural strength . . . resistance to wear and temperature extremes . . . workability. We'll be glad to help you select the best stainless grade for your job. Let our Metallurgical Engineering Department make practical suggestions.

CRUCIBLE first name in special purpose steels

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CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

CALENDAR
OF MEETINGS

December 7-8, Society of the Plastics Industry Inc.: Plastics film, sheeting and coated fabrics division conference, Commodore hotel, New York. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

December 9-10, American Management Association: Special conference on training and management development, Atlanta Biltmore hotel, Atlanta. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

December 12-15, American Institute of Chemical Engineers: Annual meeting, Hotel Statler, New York. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

December 13-14, Material Handling Institute Inc.: Annual meeting, Statler hotel, New York. Institute address: 813 Clark Bldg., Pittsburgh 22. Managing director: R. Kennedy Hanson.

December 14-15, Industrial Truck Association: Annual meeting, Hotel Statler, New York. Association address: 526 Washington Loan & Trust Bldg., Washington 4. Secretary: William Van C. Brandt.

January 5-7, Institute of Scrap Iron & Steel Inc.: Annual convention, Saxony, San Souci, Sea Isle hotels, Miami Beach, Fla. Institute address: 1729 H St. N.W., Washington 6. Executive vice president: Edwin C. Barringer.

January 10-13, American Road Builders' Association: Annual meeting and exhibit, Roosevelt hotel, New Orleans. Association address: World Center Bldg., Washington 6. Executive vice president: Eugene Reybold.

January 10-14, Society of Automotive Engineers Inc.: Golden anniversary annual meeting, Sheraton-Cadillac and Statler hotels, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

January 12, Aluminum Extruders Council: Winter meeting, Saxony hotel, Miami, Fla. Council address: 209 Washington St., Boston. Secretary: Phillip Lemelman.

January 12-14, Southern Industrial Distributors Association: Midyear meeting, Edgewater Gulf hotel, Biloxi, Miss. Association address: 208 Peachtree Arcade, Atlanta 3. Secretary: Ted Pugh.

January 13, National Constructors Association: Annual meeting, Hotel Plaza, New York. Association address: 50 E. 41st St., New York 17. Secretary: C. B. Bronson.

January 14-15, Machinery & Allied Products Institute: Economic conference, Mayflower hotel, Washington. Institute address: 1200 18th St. N.W., Washington 6. Secretary: Charles W. Stewart.

January 18-20, Caster & Floor Truck Manufacturers Association: Annual meeting, New Weston hotel, New York. Association address: 27 E. Monroe St., Chicago 3. Executive secretary: Harry P. Dolan.

January 18-20, National Industrial Conference Board Inc.: General session for all associates, Hotel Astor, New York. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

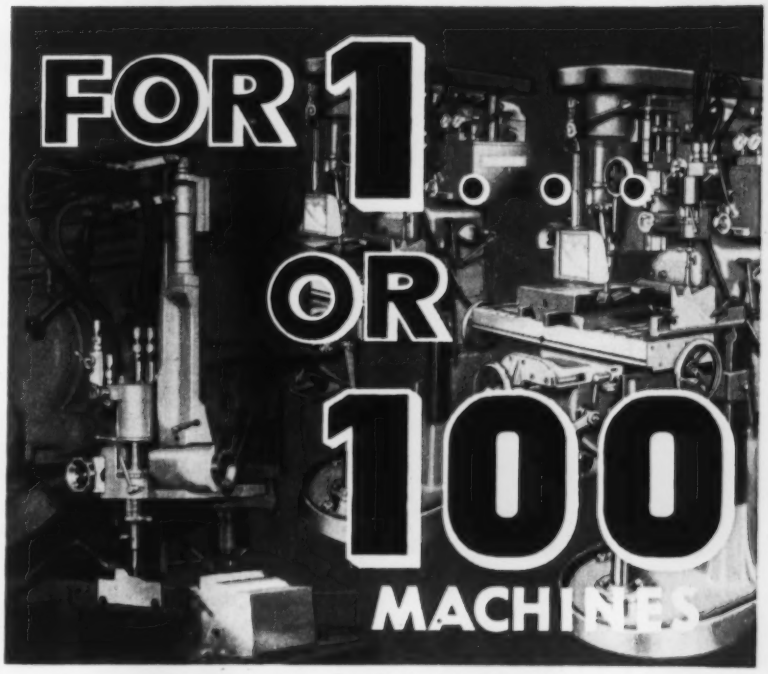
January 19-20, Steel Shipping Container Institute Inc.: Winter meeting, Hampshire House, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

January 20, Cutting Tool Manufacturers Association: Annual meeting, Oakland Hills Country Club, Detroit. Association address: 416 Penobscot Bldg., Detroit. Secretary: Martin J. Ewald.

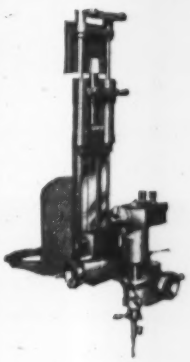
January 20-21, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association address: 79 W. Monroe St., Chicago. Executive director: J. Dwight Evans.

January 21, Engineers Joint Council: General assembly, Hotel Statler, New York. Council address: 29 W. 39th St., New York 18. Secretary: Stewart E Reimel.

January 23-27, Associated Equipment Distributors: Annual meeting, Conrad Hilton hotel, Chicago. Association address: 30 E. Cedar St., Chicago. Secretary: P. D. Hermann.



GOODRICH HYDRAULIC



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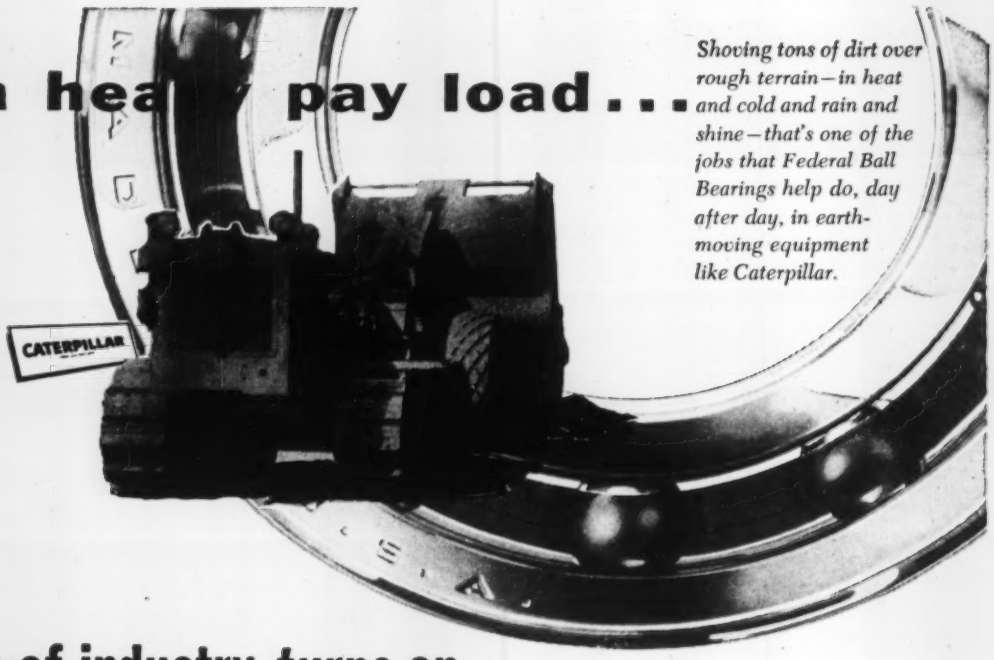

Shoving tons of dirt over rough terrain—in heat and cold and rain and shine—that's one of the jobs that Federal Ball Bearings help do, day after day, in earth-moving equipment like Caterpillar.

so much of industry *turns* on FEDERAL ball bearings

Out in the open—or in on a desk—out on the road or up in a plane—the chances are you'd find Federal Ball Bearings quietly and efficiently at work—in some of the hundreds of types and 12,000 sizes this 50-year-old company is currently producing. When Federal Ball Bearings are a part of so many things you *use*, why shouldn't they be a part of the things you *make*?

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Business counts on business machines to keep working smoothly with little or no attention—one reason why so many business machine makers like IBM count on Federal Ball Bearings.

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New facts for your file on

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

Stainless Steel milk dispensers fabricated at rate of 120 units per day

BY UNITED REFRIGERATOR

The experience of United Refrigerator Company, Hudson, Wis., shows how adaptable Stainless Steel is to mass production operations. Milk dispensers—used for serving cold milk in glasses in schools, restaurants and the armed services—are being fabricated from Stainless Steel at a rate of more than 120 units per day.

United uses no special equipment in fabricating Stainless Steel. Such operations as shearing, punching, notching, braking, soldering, spot welding and grinding take place on equipment used for fabricating mild steel.

Shop practices are much the same, too. Blades are kept a little sharper, dies a little smoother and greater care is exercised to prevent marring the smooth surface of Stainless.

The result is a product with a high degree of sales appeal . . . made from a material perfectly suited for the sanitary nature of the application.

Stainless Steel milk dispensers after assembly at United Refrigerator Company.

Polishing the inside of a 30-quart bowl at ACF Industries.

Mixing bowls –12 to 160 quarts–

drawn from Stainless Steel

ACF Industries, at its Milton, Pa. works, fabricates a line of industrial mixing bowls used by bakeries, restaurants, chemical plants, cosmetic manufacturers and the like. Depending on service conditions, the bowls are of carbon steel or Stainless Steel. But the same fabricating equipment is used for both.

Fabrication of a 30-quart Stainless bowl begins with two draws on a 1000-ton hydraulic press. The 31½" circle is first reduced to 20" and then to 14½" making a bowl 15" high. Stainless used is 16 gage.

The bowl is then annealed and pickled, the flange is trimmed, it is spun and beaded on a lathe, the outside is polished, handles and fittings are welded on and the inside is polished.

Even dies are used interchangeably between carbon and Stainless. Stainless requires only a little more careful handling.

Stainless Steel is not difficult to fabricate -it's just different

You pay no penalty in shop procedure to obtain the outstanding sales benefits of Stainless Steel. You can usually use the same equipment used for carbon steel with the addition of a little more power and a little more care.

So put Stainless Steel into your designs and into your selling. Our representatives will be glad to help you select the proper grade and fit it to your fabricating procedure.

USS

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

"We machine these forgings on the double"

says Frank W. Koch, U.S. Steel Machinist

IN a constant effort to save money and speed delivery for our customers, we commonly machine even large forgings two at a time. In the set-up shown here, 8 tools were used at one time (in four tool holders) to machine these forged hammer bases as fast as humanly possible without sacrificing quality in any way.

It takes an experienced machinist to do work like this. Frank Koch started as a USS Machinist's Helper in 1925, and he has been at the job ever since. He has been working the big planers, like the one in the picture, for 18 years. Some of the toughest machining problems in the book are old stuff to him. The young man on the right is Stanley Kiragis, a Machinist's Helper, following in Frank Koch's footsteps.

When you buy a USS Quality Forging, you can be sure that seasoned hands like Frank Koch will carefully nurse it through the shop. With "homemade" steel, and the finest equipment, they assure you of a quality job, delivered on time, every time. Write for our free 32-page booklet that describes these forgings. Address United States Steel, Room 4570, 525 William Penn Place, Pittsburgh 30, Pa.

USS

Quality

Resistance to rugged operating conditions is provided by Refractory Concrete at this Y-connection in hot-blast main at the National Tube Division of United States Steel Corporation, McKeesport, Pa. Refractory Concrete provides smooth, jointless construction.

. . . A tough problem solved by refractory concrete

A hot-blast furnace main presents a tough refractory structural problem where the curved arches meet in a Y-intersection. How refractory concrete solves the problem is shown above. Repairs and maintenance were reduced, and time was saved both in installation and operation.

Such jobs call for a refractory that resists extreme conditions of abrasion and thermal shock. In an emergency, refractory concrete, made with Lumnite* calcium-aluminate cement, was tried. Result: a successful job, and refractory concrete is now commonly used for this purpose.

Refractory concrete may solve some of your refractory problems. It withstands temperature of 2600°F. or more, has low volume change, and is highly resistant to thermal shock.

FOR CONVENIENCE, you may prefer to make refractory concrete with prepared castables (packaged mixes of Lumnite Cement and aggregates selected for specific temperatures and insulation service—add only water). They are made by refractory manufacturers and sold through their dealers. For more information, write Lumnite Division, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

**"LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.*

MP-L-89

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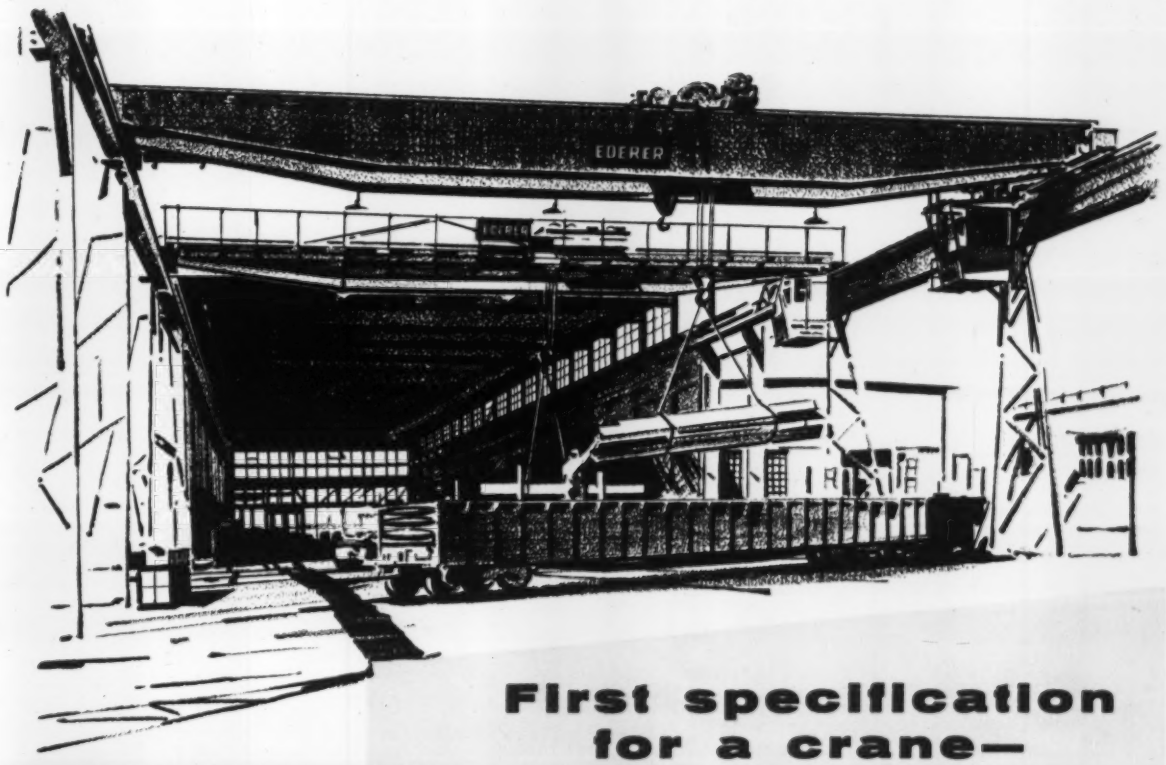
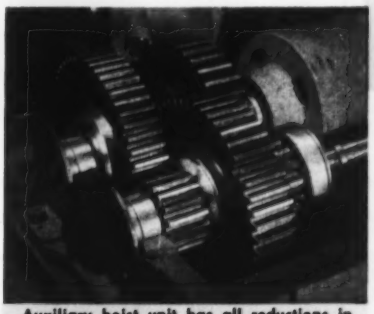
REFRACTORY, INSULATING, OVERNIGHT, CORROSION-RESISTANT

A UNIVERSAL ATLAS PRODUCT

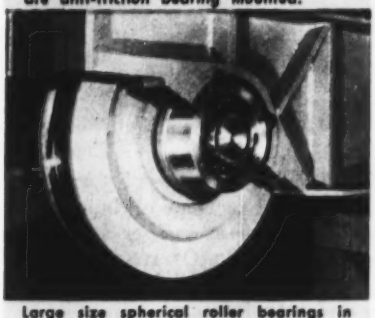
UNITED STATES STEEL HOUR—Televised alternate weeks—See your newspaper for time and station.



First specification for a crane— the job to be done



Auxiliary hoist unit has all reductions in one oil-tight case. All gears and quills are anti-friction bearing mounted.



Large size spherical roller bearings in MCB type wheel mounting; wheel and bearing easily removed. Rotating axle is coupled direct to bridge drive shaft.

When an EDERER engineer talks about a crane with you—foremost in his mind are your exact materials handling requirements—loads to be moved—span—runway length—operating speeds—any special conditions peculiar to your plant. With this information, EDERER "job-engineers" a crane to these exact requirements. Also—every EDERER crane is heavy-duty construction throughout—with oversize parts—plenty of safety margin—most efficient operating speeds. Then—on the job—your crane delivers capacity performance—with minimum maintenance—lowest cost-per-ton handling. EDERER can "job-engineer" a crane to *your* specific requirements. Why not send for the new EDERER crane catalog—Bulletin CR-610?

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CRANES

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OVER 50 YEARS "JOB-ENGINEERING" CRANES FOR INDUSTRY

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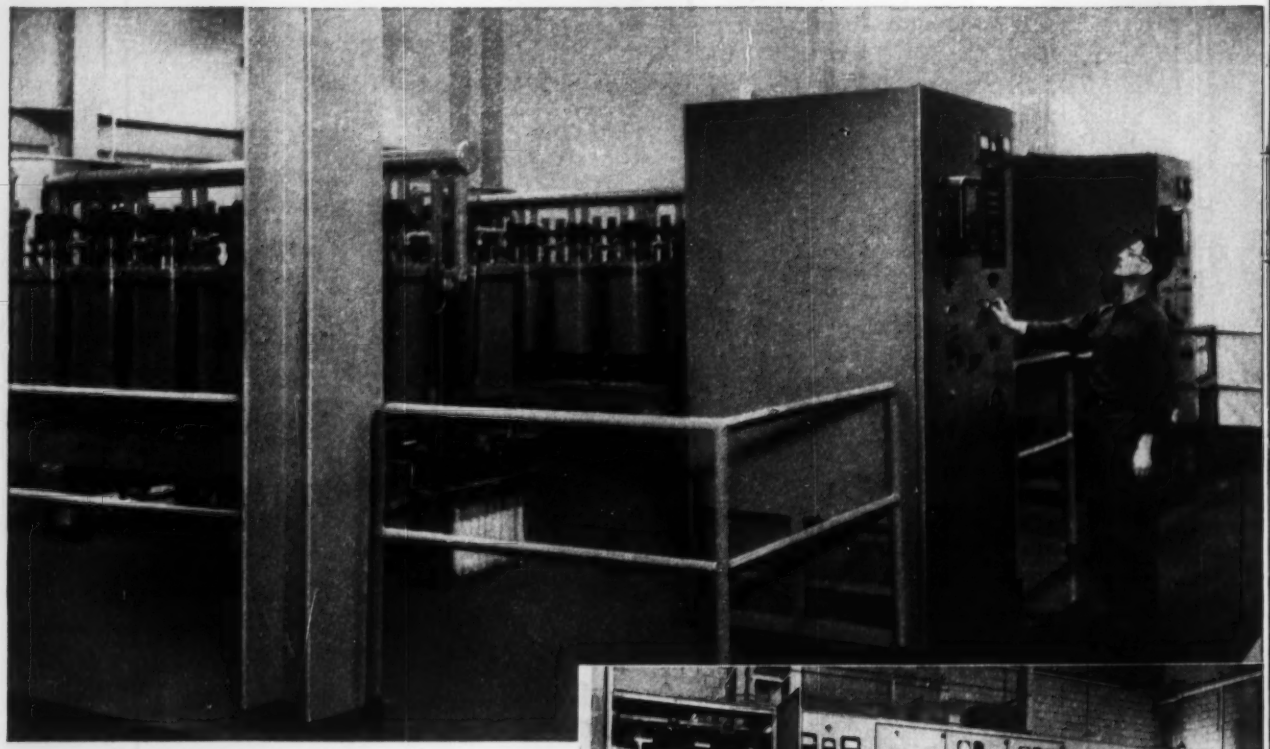
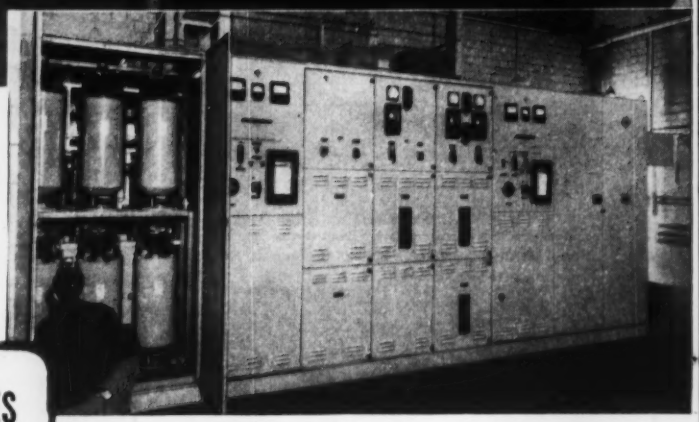




BILLET MILL RECTIFIERS: Two 1500-kw, 250-volt rectifiers supplying dc service to cranes and runout tables in 30 and 21-inch Billet Mills. Rectifiers are provided with automatic control and provisions for starting and stopping by manual or remote control.

*6 OUTSTANDING RECTIFIER FEATURES

1 **Continuous Excitation:** pilot arcs always present. Eliminates need for synchronized re-ignition. Enables rectifier to ride through severe ac voltage disturbances.

2 **Fixed Excitation Anode:** doesn't contact cathode mercury and is independent of level, turbulence or impurities . . . requires no adjustment, maintenance or replacement.

3 **Internal Cooling System:** high heat transfer with seamless tube cooling located within the rectifier.

4 **Enameled Anode Seals:** multi-layer fused vitreous construction provides high-strength seal unaffected by thermal variation.

5 **Grid Phase Control:** in cleaner region near anode, where ion density is lowest.

6 **Arc-over Free Tube:** insulating entire arc path eliminates danger of arcing-over to tube.

COKE PLANT RECTIFIERS: One of two 500-kw, 250-volt metal-clad rectifier units supplying dc service to coke plant pusher and coke handling equipment in Coke Oven area. Units are factory assembled and wired, complete with dc switchgear and transformers.

ALLIS-

FAIRLESS

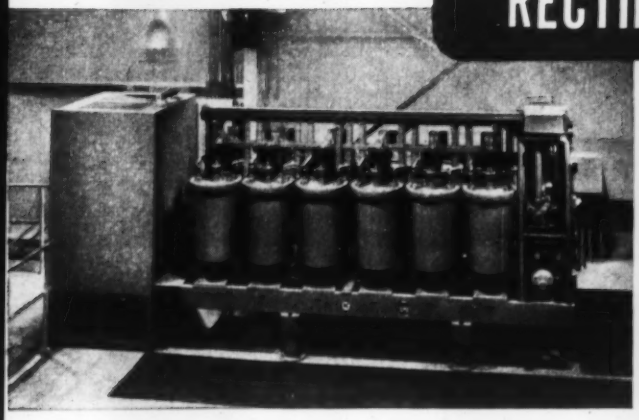
Material Handling

At Fairless Works of the U.S. Steel Corporation — the world's newest and most modern steel mill, continuous dc service is essential to material flow. Any interruption in this critical power supply would cause serious equipment damage and heavy production losses throughout the entire mill. Here, as in other mills over the United States, Allis-Chalmers mercury arc rectifiers are backing up their reputation for continuous, trouble-free operation under variable operating conditions.

In dc load centers located strategically throughout this gigantic plant, 19 Allis-Chalmers rectifiers produce *all* the 250-volt dc supply for every material handling operation . . . from unloading the ore to stockpiling finished steel. These rectifiers are designed and engineered for steel mill duty, and offer highest service reliability and efficiency with low maintenance features necessary for maximum mill output.*

For the same dependable dc service in your mill, specify Allis-Chalmers mercury arc rectifiers. Call your nearest A-C sales office for complete information, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A 4302

MERCURY ARC RECTIFIERS



OPEN-HEARTH FURNACE RECTIFIERS: One of two 1500-kw, 250-volt rectifiers supplying dc service to cranes, pig casting machines, bailer, slag cars, and stock house equipment. Provided with automatic control and provisions for starting and stopping by manual or remote control.

RECTIFIER TRANSFORMERS: Two 13,800-volt outdoor transformers feeding two 750-kw, 250-volt rectifiers in Central Maintenance shop. Rectifiers supply dc service to maintenance shop cranes, machine tool equipment and provide auxiliary power for electronic testing devices and welding machines.

CHALMERS

A-C ALLIS-CHALMERS

Our Engineers Introduced Mercury Arc Rectifiers to U.S. Industry

Are you BARRED

from planned assembly savings

BY A THREAD?

Screws can be "trouble-bent" in many ways. Most thread faults like those listed here are invisible, but their effects (job slowdown, parts spoilage, high reclamation expense, hidden weakness) show clearly in assembly costs and customer complaints.

That's why P-K quality standards have been set so high—to make sure you get Self-tapping Screws that are not only threaded, but headed, pointed and heat-treated with one purpose in mind, to keep your assembly lines trouble-free.

For information on any fastening problem, talk to a P-K Assembly Engineer. Parker-Kalon Division, General American Transportation Corporation, 200 Varick St., New York 14. Chicago Warehouse, 4331 West Lake St., Chicago 24.

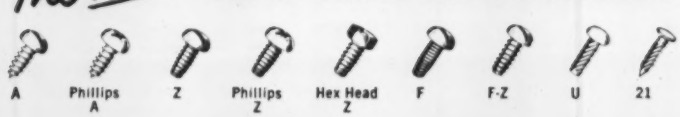
IS DIAMETER OFF-SIZE?
— means hard driving
— breakage
— weak fastenings
DO THREADS STOP SHORT OF HEAD?
— means loose screws
ARE THREADS RAGGED and SEAMED?
— makes driving difficult
ARE THREADS TOO SOFT?
— means spalled threads
ARE THREADS TOO HARD?
— means stripped threads
IS POINT (on Sheet Metal Screws) BLUNT?
— makes starting difficult

P-K STANDARDS PROTECT you against the thread faults illustrated and many others that will cause assembly trouble and weak fastenings. They don't "get by" P-K inspectors—that's why *all* P-K Self-tapping Screws can be "Guaranteed First Quality."

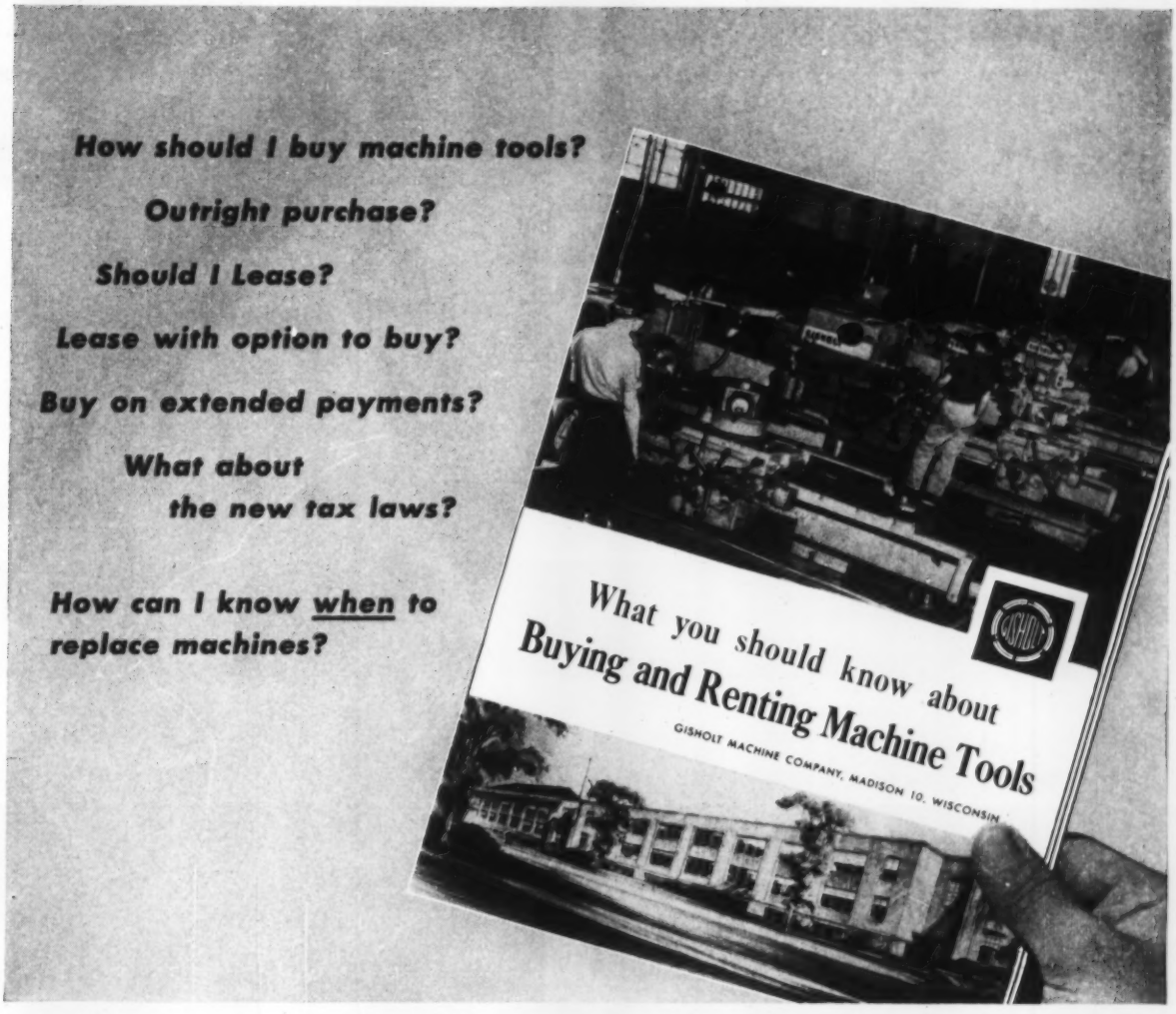
EASTMAN KODAK speeds up assembly of the Kodalite Flashholder by using P-K Self-tapping Screws. Troublesome tapping of small holes in plastic was eliminated. Screws are driven with hopper-fed automatic machines, removing necessity for tedious screw handling and placement. Two P-K Phillips Head Type F Screws fasten a cover mounting bracket to the flashholder case (right) and three more fasten the metalized Tenite II reflector to the case (left). Case is a thermo-setting phenolic. Screws hold firmly under all stresses of normal use, can be removed for attachment of new reflector.

PARKER-KALON

The First SELF-TAPPING SCREWS



IN STOCK . . . see your nearby P-K Distributor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This New Gisholt Bulletin Will Help You

Recently, a lot of things have been happening which tend to confuse the outlook for buyers of machine tools and other industrial equipment. So Gisholt prepared this booklet to deal with the most important of them. The aim is to help you find the wisest answers in your particular case.

The booklet discusses leasing and time payment plans, makes cost comparisons, discusses depreciation under the new tax codes, replacement programs and the MAPI formula for machine replacement. A copy of this booklet is yours for the asking. No obligation, of course. Use the coupon.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

The Gisholt Round Table represents the collective experience of specialists in the machining, surface finishing and balancing of round or partly round parts. Your problems are welcome here.

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☐ Please send me a copy of your new booklet on extended-payment and leasing plans.

☐ Please have a Gisholt representative call on me.

Name.....*Title*.....

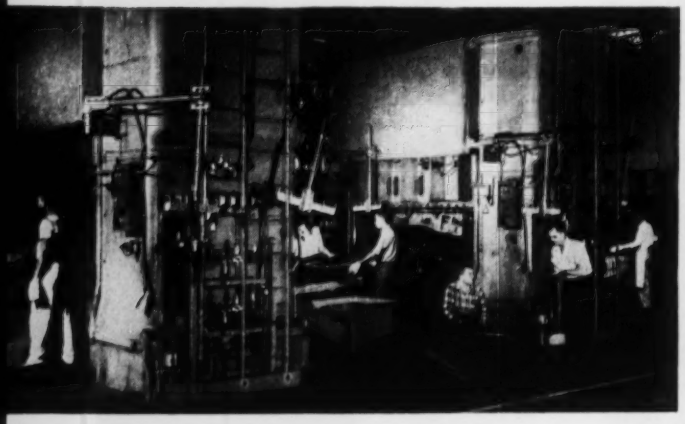
Company name.....

Street address.....

City.....*Zone*.....*State*.....

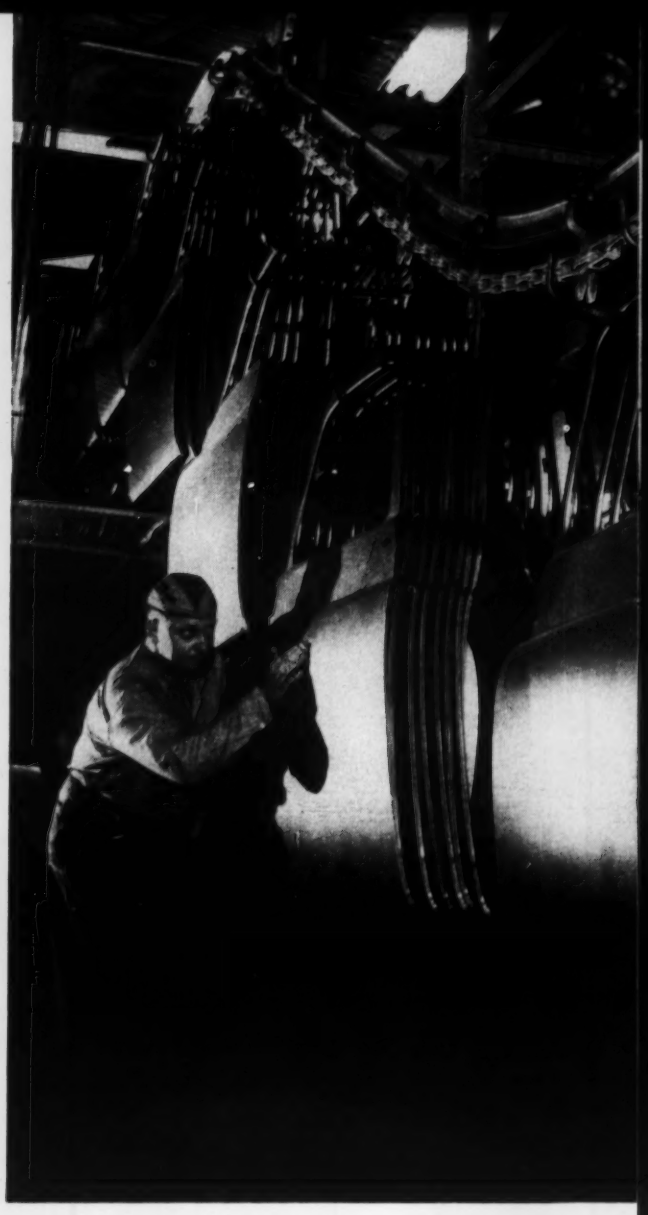
(Advertisement)

1. Sheet Steel is drawn to the contour of an inner door panel in the 700-ton-ram double-action press, then progresses through . . .



2. Four More 600-ton presses that restrike, trim, pierce and give the panel final form.

3. Pressed and Welded to the outer door, the door assembly is completed so that it will fit neatly and hinge properly.

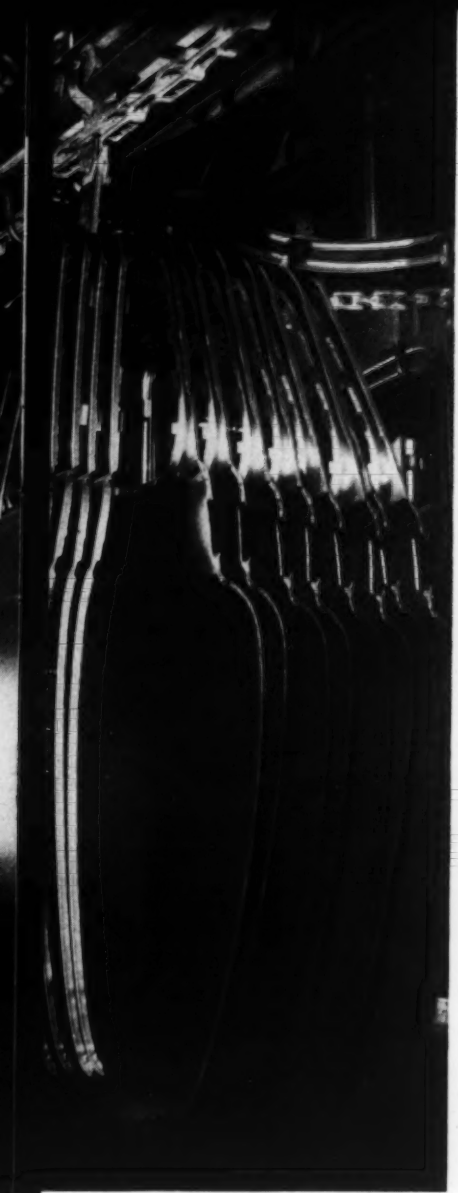


4. To Produce hundreds of smoothly contoured doors per hour takes perfect

This Steel Meets Automa

Automation is forcing steel to its severest test. Modern die engineering and streamlined press operations demand the best in sheet steel for high speed production. For example, take the giant 700-ton-ram double-action press at the entry end of an automobile door panel press line.

As fast as one door panel is drawn under tremendous pressure to the contour of the punch die, another panel is in position. From this first operation, the door panel passes through a series of four more 600-ton presses (photo No. 2) that restrike, trim, pierce and



teamwork between men, machines and cold rolled steel sheets. Read why . . .

tion's Challenge

give the door its final form.

At the delivery end of the press lines (photo No. 3), completed door panels are delivered by the hundreds per hour —each door gracefully styled and strong. Through all of these operations, the steel must exactly meet specifications that permit it to be drawn and shaped. It must be uniform throughout each sheet, and from sheet to sheet.

● **Meeting The Test**—Steel, to meet such rigid requirements, is not easy to make. That's why top auto producers buy steel from quality steel makers, such as Pittsburgh Steel Company, who have the know-how and modern equipment to produce inherent quality in cold-rolled sheet to meet automation's challenge.

This challenge is one of uniformity. To become a smoothly contoured automobile door with beautiful surface finish the steel cannot vary more than a few thousandths of an inch in thickness. Its chemical composition must be held to a few ten-thousandths of an ounce. The grain structure is controlled so that even a microscopic change would be evident.

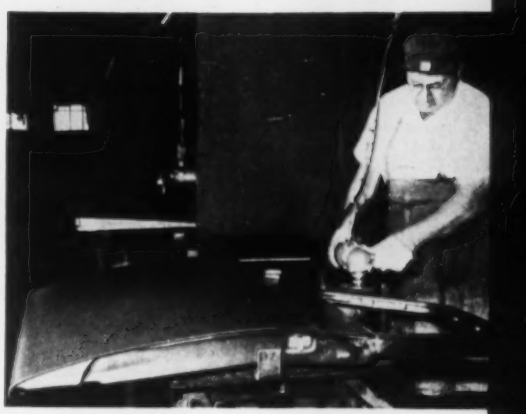
The steel that goes onto production lines from Pittsburgh Steel, then, has been custom-built to do the job it is designed to do. It has proper internal qualities: exact chemical analysis, cleanliness, and fine grain size. It has the necessary external qualities: dimensional uniformity and surface cleanliness.

On high speed press operations, this means longer trouble-free runs and better quality in the end product. It minimizes the possibility of laminations, grainy surface, seams, buckles, wrinkles and tears, stretcher strains, and skin breaks—increases yield, speeds production and prolongs die life.

The inherent quality of the steel also assures a perfect surface when the door is disced and polished with fine abrasive. It requires less finishing, provides a clean, sound base for painting.

● **How It Is Made**—The story behind this quality sheet steel goes back to the materials that go into Pittsburgh Steel's modernized blast furnaces—the enlarged open-hearth furnaces—the new blooming mill—the new 66″ hot rolled sheet mill. Here, reverse rolling techniques, special high pressure water sprays, and electronic control of rolling temperatures impart a fine grain structure and smooth surface finish so that the steel can be properly cold-rolled.

The cold-rolling is done on Pittsburgh Steel's new 66″ four-high, four-stand mill. It employs the most modern electrical system ever installed on a cold mill to provide faster speed control of the rolls, tension control across the surface of the sheet and scientifically accurate gage indication—all designed to achieve the utmost in uniformity.



5. Finished Quality of the graceful style lines is assured as the surface is sanded and polished before painting.

● **Producing Quality**—Fabricating operations everywhere in industry are becoming more and more dependent on quality in steel as the trend toward automation gains more momentum. Because automation not only means faster and lower cost production, but also better products for competitive markets, it is beginning to single out the producers of quality steel.

Pittsburgh Steel offers you the kind of cold-rolled sheet you need to meet your production line requirements, when and where you want it. Your orders get prompt personal attention from the time they are entered on the books until your product is completed.

If you are not now among those taking advantage of the savings this offers, why not call the nearest district sales office today? *Write for your color brochure "The New Pittsburgh Steel Company."*

"Everything New But The Name"

Pittsburgh Steel Company

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Announcing...

Electromet's New Electrolytic Chromium Metal

FOR ADDING CHROMIUM TO

- HIGH-TEMPERATURE ALLOYS
- CORROSION-RESISTANT ALLOYS
- ELECTRICAL RESISTANCE ALLOYS
- NON-FERROUS METAL-CUTTING TOOLS
- CHROMIUM BRONZES
- HARD-FACING MATERIALS
- HIGH-STRENGTH ALUMINUM ALLOYS

Now, for the first time, electrolytic chromium metal is commercially available in tonnage quantities. It is being manufactured in ELECTROMET's new Marietta, Ohio plant. *Electrolytic chromium can be advantageously used whenever additions of chromium of low iron content are needed.*

For further information about electrolytic chromium metal and other ELECTROMET ferro-alloys and metals, please contact the nearest ELECTROMET office listed below.

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

ELECTRO METALLURGICAL COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
OFFICES: Birmingham • Chicago • Cleveland • Detroit
Houston • Los Angeles • New York • Pittsburgh • San Francisco
In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

Electromet
TRADE MARK
Ferro-Alloys and Metals

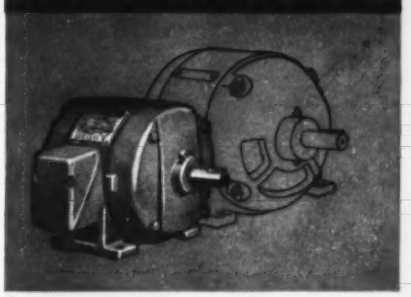
8 reasons why you should

MODERNIZE EQUIPMENT WITH TRI 55 CLAD MOTORS

REG. U.S. PAT. OFF.

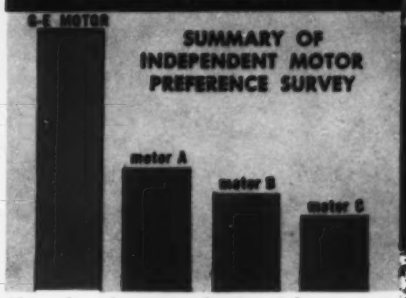
Plan now to modernize your equipment with the all-new General Electric Tri-Clad '55' motor, available now in many ratings; entire line of 1 to 30 hp a-c motors available soon. Contact your G-E Representative. General Electric Company, Section 648-6, Schenectady 5, N. Y.

MORE POWER PER POUND



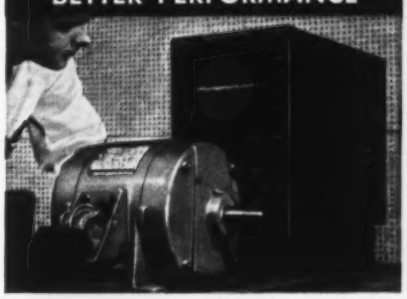
Lighter and smaller Tri/Clad '55' motors in new NEMA frame sizes and ratings save you space and weight, reduce handling costs.

BUYER PREFERENCE



You take advantage of a 2 to 1 buyer preference for the electric motors on your equipment when you buy or specify a G-E motor.

BETTER PERFORMANCE



Quieter operation, proved by sound-room tests, is typical of the many performance improvements in the new G-E Tri/Clad '55'.

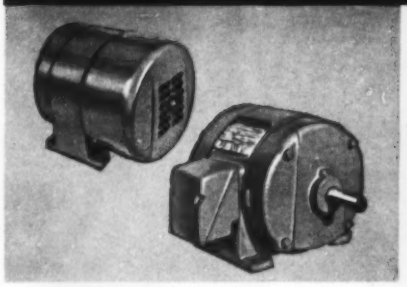
LONGER LIFE

A silicone Dri-film* coating makes insulation shed water—lengthens motor life. Polyester-film insulation is 8 times stronger.

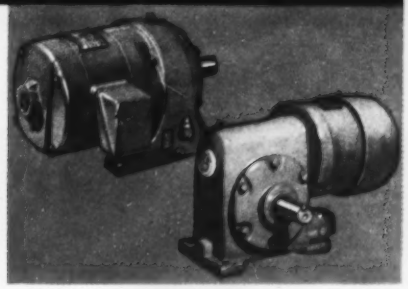
EASIER INSTALLATION

Perma-numbered leads are always instantly read even when wires are taped or clipped. Conduit box has plenty of knuckle room.

COMPLETE LINE OF NEW MOTORS



A complete line of new motors assures the right electrical drive for your machine. Write for Bulletin GEA-6013 on dripproof motors,



GEA-6012, on enclosed motors. For low speed jobs, G.E. offers a complete line of gear-motors. Write for Bulletin GEA-6027.

NEAR-BY SERVICE

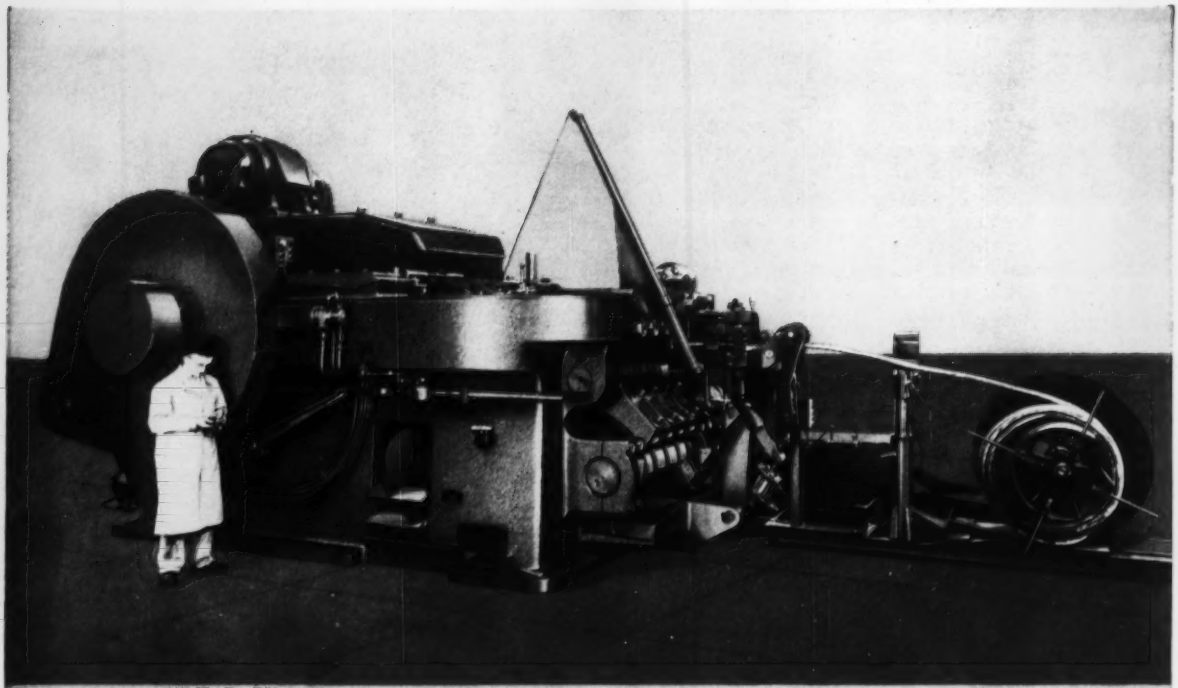
CLASSIFIED
Electric Repair Service
—(Continued)
GENERAL ELECTRIC
SMALL MOTOR SERVICE STATION
Complete facilities for in and out-of-warranty repair or exchange of A-C and D-C motors and generators to 15 HP. Authorized distributor G-E motor renewal parts and G-E single-phase motors.
"WHERE TO CALL"
AUTHORIZED G-E MOTOR SERVICE
Street Address..... Phone No.

G-E service is as close as your telephone. Authorized motor service stations* provide repair-facilities in all major trading areas.

*Reg. trade-mark of General Electric Co.

Progress is our most important product

GENERAL ELECTRIC



AUTOMATIC FORGING MACHINES!

This is the largest high-speed automatic cold-forming machine yet built, and larger ones are in the works.

Using 1-1/2-inch diameter coiled hot-rolled stock, this 200,000 pound machine, designed and built by NATIONAL, automatically produces 40 clean, accurate parts per minute!

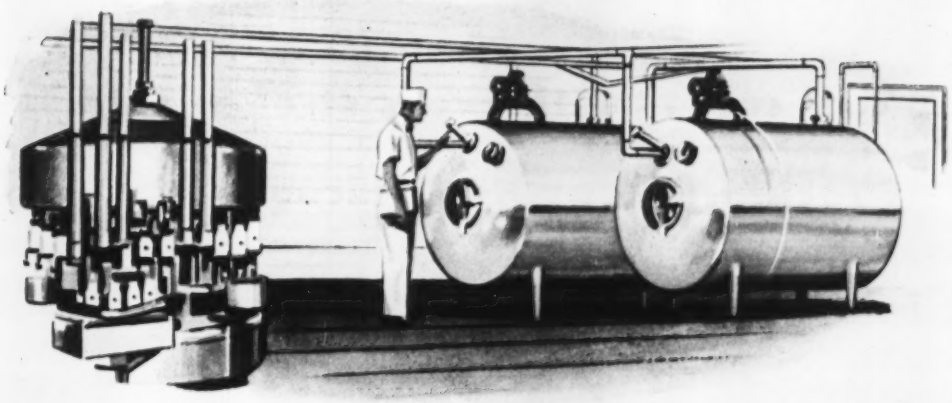
Through the years we have teamed up with industry on many novel automatic hot and cold forging installations — for making a wide variety of fasteners, automotive and aircraft components, and other parts.

If you need to make metal parts faster, stronger and at lower cost, let us work with you. Send us your prints and samples, or better yet, visit us. No obligation.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO — SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

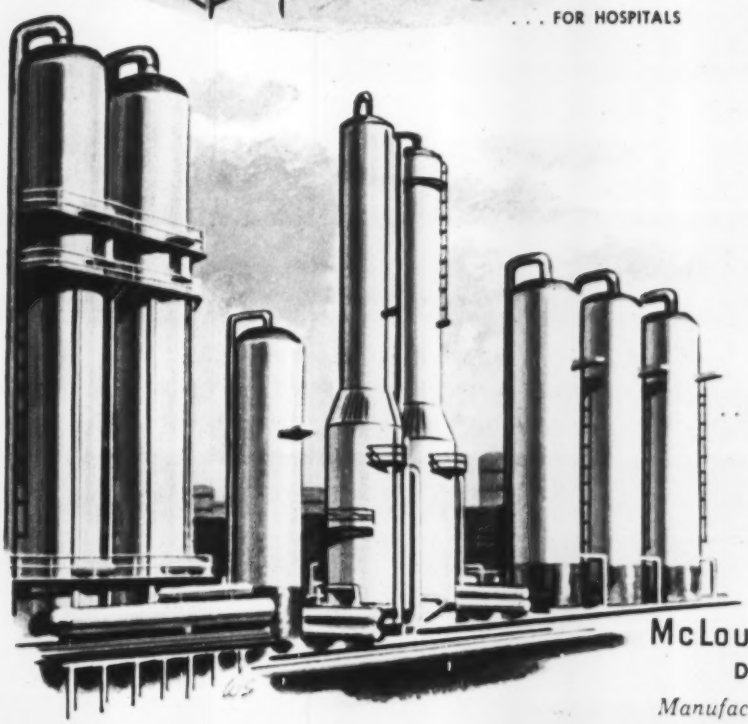


. . . FOR DAIRIES

. . . FOR HOSPITALS

McLouth STAINLESS Steel

High quality stainless sheet and strip steel . . . for the product you make today and the product you plan for tomorrow.



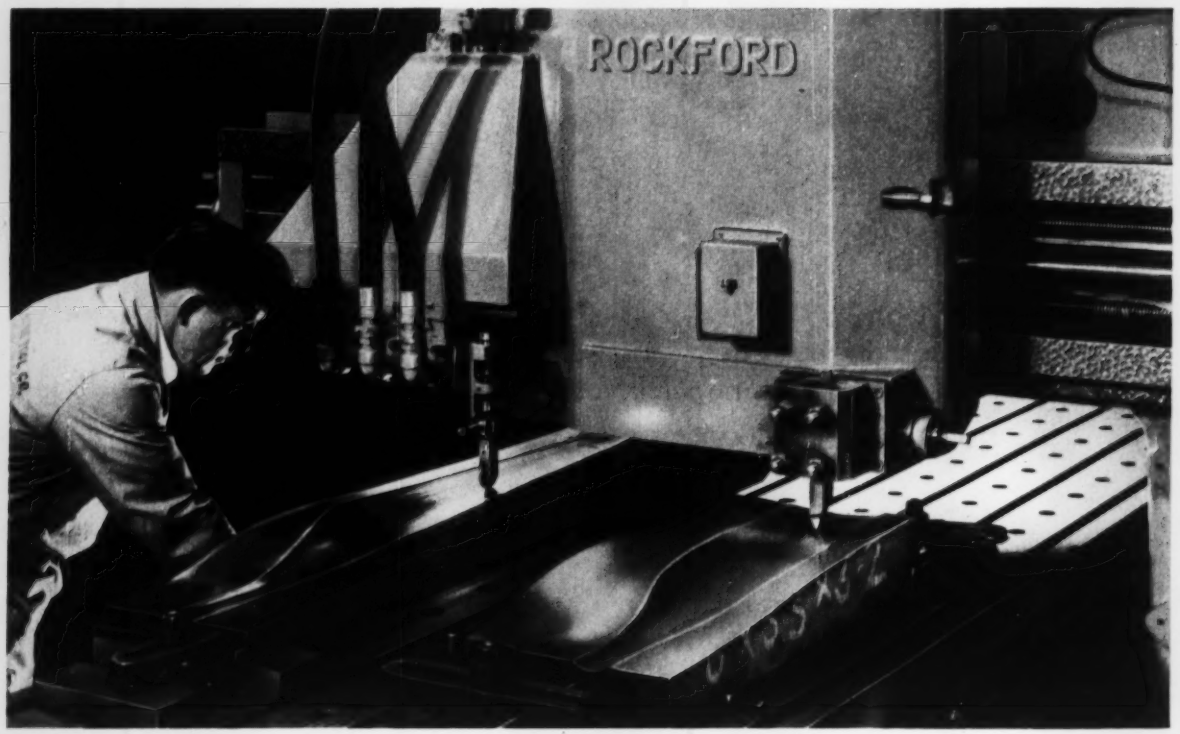
. . . FOR THE CHEMICAL INDUSTRY

McLouth Steel Corporation
DETROIT, MICHIGAN
Manufacturers of Stainless and Carbon Steels

a cost cut . . . with every stroke

of rockford kopy-kat hydraulic

duplicators



higher production is obtained with every stroke **because...**

the unique Kopy Kat duplicates automatically. Its hydraulic duplicator valve is so sensitive, so exact, that positive duplication of complex forms is done with the ease of straight-production machining.

Ask us for recommendations for your duplicating shaping, planing, slotting and turning work.

OUR 52nd YEAR

ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET · ROCKFORD, ILLINOIS

Eaton-Reliance

SPRINGTITES & SEMS

Reduce Production

Problems.... *Right Now!*

If you use bolts and lock washers for fastening assemblies . . . here's a suggestion for saving time and money. Substitute Reliance Springtites and Sems. It is possible to reduce manual fastening time by ½ and multiply efficiency by 2.

The reason for this saving lies in the one piece design of these Reliance fasteners. By making the lock washer an integral part of the bolt, yet free to rotate and function, production workers eliminate the steps of picking up a lock washer, slipping it in place and holding it until the piece is fastened. Production costs are definitely affected . . . for the better.

In addition, Reliance Springtites and Sems are easier to use in "hard-to-get-at" places, they are less apt to get lost and they offer an inventory that is automatically balanced... 1 lock washer and 1 bolt equal one Springtite or Sem.

Engineering bulletin S-49 will give you more complete details. Write for a copy and it's yours. No obligation.

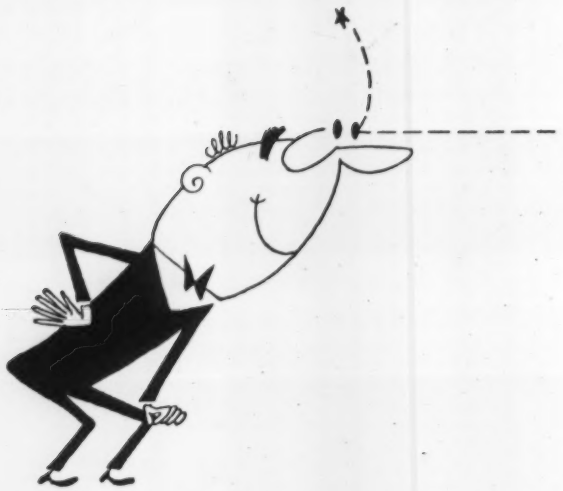
RELIANCE DIVISION
[illegible] ST., ALLIANCE, OHIO

EATON MANUFACTURING COMPANY

Springtites & Sems · Snap & Retaining Rings · Special Steels · Spring Lock Washers · Hex-Pan-Nut

Detroit • Chicago • St. Louis • San Francisco • Montreal

[illegible] REGISTERED TRADEMARKS OF THE EATON MANUFACTURING COMPANY



There's more than meets the eye–

in Honeywell instrumentation

SPECIALIZED Application Engineering is one of the most important extra values you get in Honeywell instrumentation. Although it's unseen, it's a vital part of your measuring and controlling equipment . . . for it's what assures you of getting most effective utilization of the instrument performance that you buy.

Here's how this service works for you. First, a Honeywell field man sits down with your engineers, production men and instrument technicians. He digs out the facts about your process . . . finds out what needs to be measured or controlled, to what accuracy, under what conditions.

Then Honeywell's Application Engineering staff gets the problem. This group includes men who have first-hand experience in the instrumentation technology of a particular industry. Some specialize in chemical processing . . . others in metal-working . . . others in petroleum. Together they add up to an unequalled storehouse of knowledge on how to use modern instrumentation in modern production. They engineer your complete system . . . including not only the selection of instruments, primary elements and controls, but also the accessory switches, signals and interlocks that add distinctive features of convenience and safety.

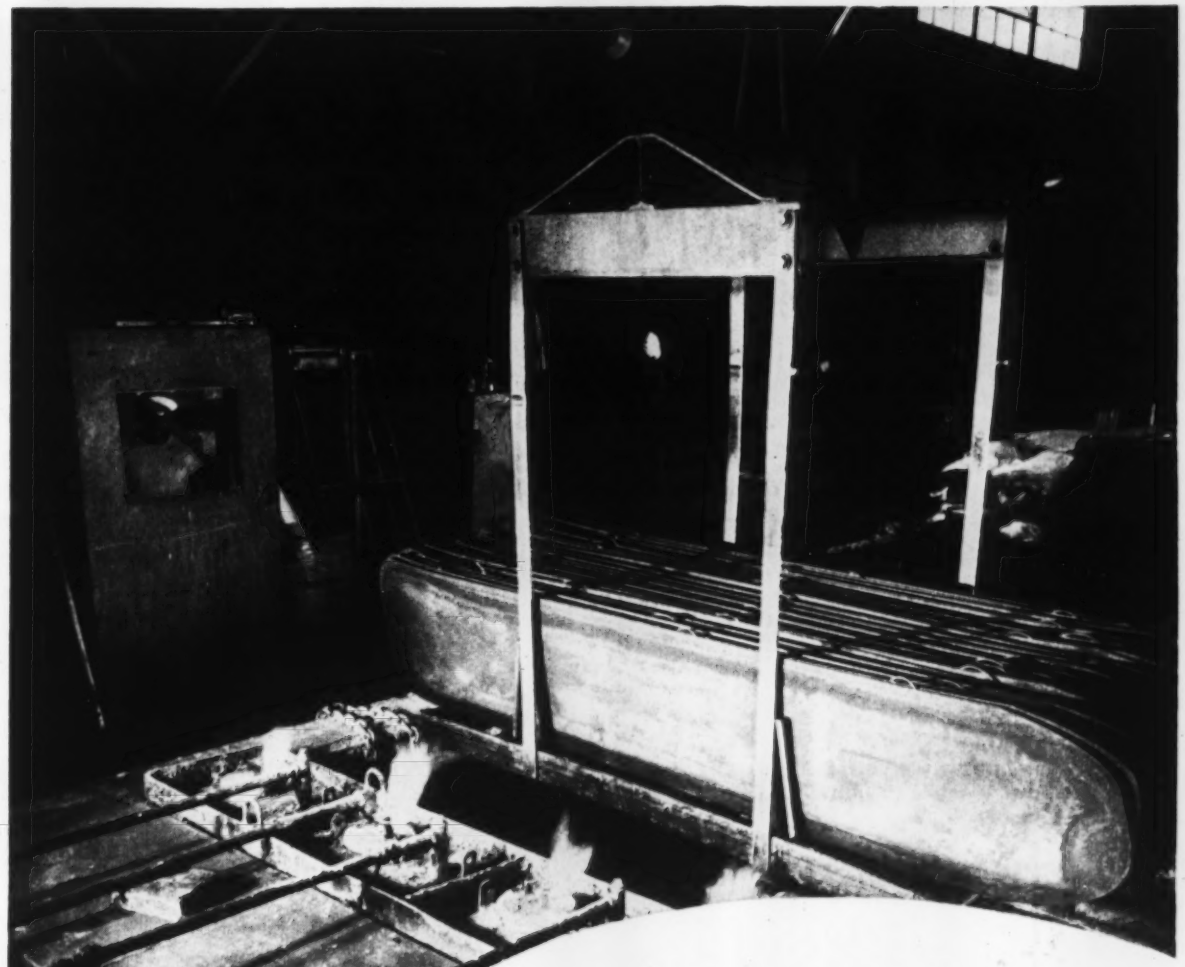
Honeywell Application Engineering takes a big burden off your own engineering staff. And it pays dividends in performance that spells real production economy, consistent quality and simplified maintenance.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls



Safely descale most metals in 20 minutes or less!

WITH THE DU PONT SODIUM HYDRIDE PROCESS

You can thoroughly descale any metal unaffected by fused caustic at 700°F.—in any size or shape—within 20 minutes in a sodium hydride bath. And because bath action stops the instant scale is reduced, there's no loss of valuable base metal—no pitting or etching to cause costly rejects.

Du Pont—pioneer of sodium hydride descaling—will be glad to give you all the details about its economical, easy-to-operate process. Just write or phone Du Pont's nearest district office or mail the coupon below.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING... *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department, S-12
Wilmington 98, Delaware

☐ Send me your descriptive booklet on Sodium Hydride Descaling.
☐ Have a Du Pont man call. I am descaling _____

Name _____
Position _____
Firm _____
Address _____
City _____
State _____

"HOW TO SELECT AN OVERHEAD CRANE"

WHITING

OVERHEAD CRANES

The information *you* need for planning and selecting the overhead crane that will give the best performance at the lowest cost is contained in a new Whiting booklet . . . Bulletin Unit 79. A helpful, technical bulletin, "How To Select An Overhead Crane" is packed with important data that is of interest to all concerned with heavy materials handling.

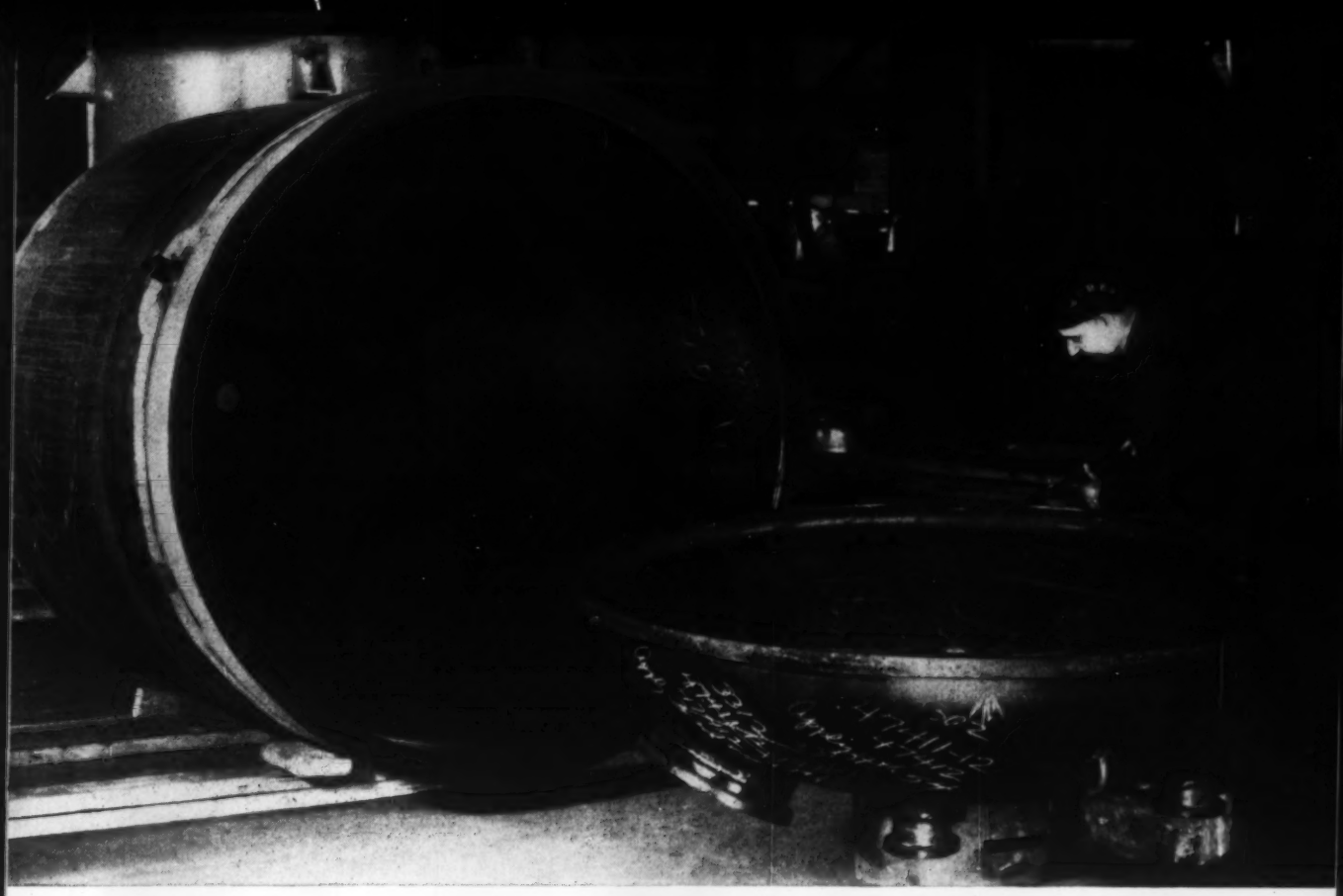
A partial list of contents reads as follows:

- The classes of crane service
- Standard crane ratings and capacities
- Standard dimensions and clearances
- Recommended speeds
- Motor ratings
- Cage or pendant operation
- How to choose the gear drive
- Structural framework recommendations
- Lubrication of gears and bearings
- 14 minimum safety features
- Erection and initial operation
- Sample form—How to request crane information
- Sample specifications

Write today for Bulletin Unit 79

WHITING CORPORATION

15643 Lathrop Avenue, Harvey Illinois



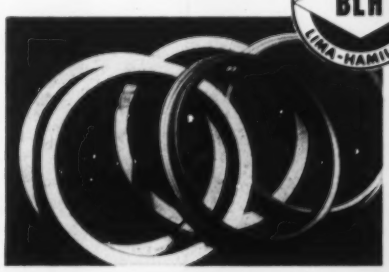
SSW forged ring flanges enable Pfaudler to increase pressure capacities of glass-lined tanks 50%

By switching to Standard Steel forged ring flanges for manholes and larger openings in their glass-lined tanks, The Pfaudler Company, Rochester, N.Y., has increased normal pressure capacities 50% above previous limits. These rolled, weldless flanges replace integral flanges formed in the tank wall or flanges formed from steel plate and welded to the tank shell.

Standard Steel forges these 24" to 84" ring flanges to heavier and more efficient shapes than Pfaudler could get previously. An increase in the flat surface area of the flanges permits increased pressures. The switch to forged flanges also has eliminated the serious problem of warping during annealing or stress relief before applying glass linings.

SSW shapes these rings as close as possible to finish dimensions in the rolling operation to minimize the amount of metal removed in roughing and finishing cuts. However, ample material is available for forming a bead on the edge of the flange to retain the clamps which hold the covers tightly on the gaskets.

Pfaudler's use of Standard Steel's weldless flanges is just one of the very diverse ways ingenious users are improving their products by switching to roll forged rings and flanges (12" to 144" O.D.). It'll pay you, too, to investigate how they can benefit you. For more facts please write to Department 8646, Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation, Burnham, Pennsylvania.



BALDWIN BLH LIMA-HAMILTON

Standard Steel Works Division

Burnham (Mifflin County), Pa.

BALDWIN-LIMA-HAMILTON

General Offices: Philadelphia 42, Pa. • Offices in Principal Cities

SHOWING FOR THE FIRST TIME - - -

A New Addition to the Dempster-Dumpster System of Low Cost Bulk Materials Handling

Now you can have either of two types of Dempster-Dumpsters in the fastest, most efficient and lowest cost method of bulk materials handling ever devised.

IN THIS MODERN, low cost system, one truck-mounted Dempster-Dumpster picks up, hauls and empties, or sets down intact, one loaded detachable Dempster-Dumpster Container after another, regardless of design or size, handling bulk materials of practically every description.

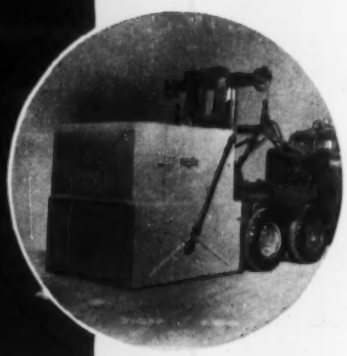
The new Dempster-Dumpster Type DTLF offers several desirable features along with all the economies provided by the Type LFW. These features include: (1) Improved load distribution with container carried in more forward position between wheel centers. (2) Extreme high dumping in cases where it is desired. (3) Vertical pick up of loaded container. (4) Container, loaded or empty, is always in horizontal plane in carrying position. Automatic locking device for positive rigidness of container while in carrying position is, of course, provided.

TREMENDOUS SAVINGS WITH THE DEMPSTER-DUMPSTER SYSTEM HAVE BEEN PROVED BEYOND QUESTION.

One truck-mounted Dempster-Dumpster, operated by only one man, the driver, serves scores of containers of various capacities up to three times greater than the average dump truck. You eliminate trucks standing idle . . . eliminate re-handling of materials . . . eliminate loading crews. You increase efficiency, sanitation and good plant-keeping.

Containers range from 2 to 21 cu. yds. capacity for use with recommended type Dempster-Dumpsters. Each container is designed to suit the materials to be handled—be they trash, rubbish, liquids, dust, bulky, light or heavy. Many leading plants, in almost every type of industry, have found it indispensable after installation. Its proved savings alone justifies an investigation of its potential value in your plant now. Write to us today for complete information. Manufactured and sold exclusively by Dempster Brothers, Inc.

The photo at left illustrates the amazing ability of the Type DTLF Dempster-Dumpster for high dumping. The three photos below show the Pick Up, Haul and Dumping action, hydraulically controlled from cab.



DEMPSTER

STEEL

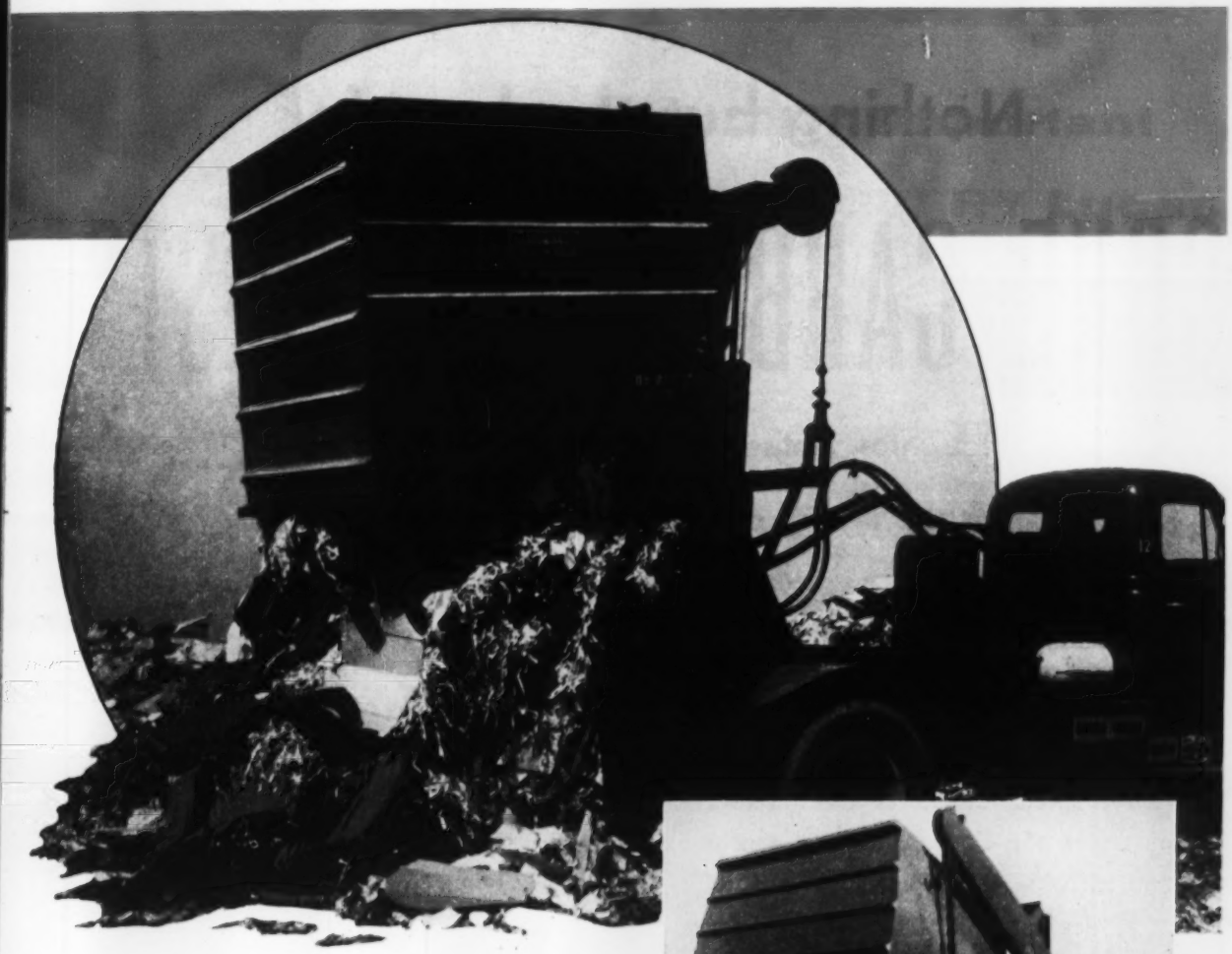
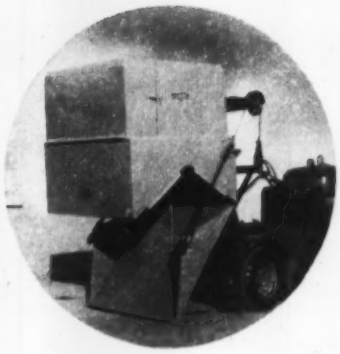


Photo above shows the new Dempster-Dumpster Type DTLF dumping 8 cu. yds. of rubbish. At right you see the Type LFW with load in carrying position. Dempster-Dumpsters are available in capacities capable of handling up to 38,000 pound payloads.



One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers . . . All Designs . . . All Sizes

BROTHERS 6124 DEMPSTER BLDG., KNOXVILLE 17, TENN.

Nothing but the best for

CONE-CARBIDE TOOL TESTS

Houghton Antisep All-Purpose Base selected for the test of carbide tools on Conomatics

With competition demanding ever increasing production speeds and lower and lower production costs, the Cone Automatic Machine Co. and carbide tool suppliers pooled their efforts in demonstrating their most modern machining equipment.

In these tests, as in all machining operations, three factors determine the results—the speed and power of the machine, the cutting and edge-holding ability of the tools and the cooling and lubricating qualities of the coolant.

Advances in machine design and carbide tool development were clearly demonstrated, using only the best of materials throughout, *including the cutting fluid.* Engineers in charge, who know coolants from long experience, used Antisep All-Purpose Base.

Houghton Antisep All-Purpose Base, mixed one part to twenty-five parts of water, gives high lubricity and anti-welding performance, discourages bacterial growth and rancidity and provides the high cooling efficiency and low cost of water. Try it today on *your* toughest machining jobs. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Penna.

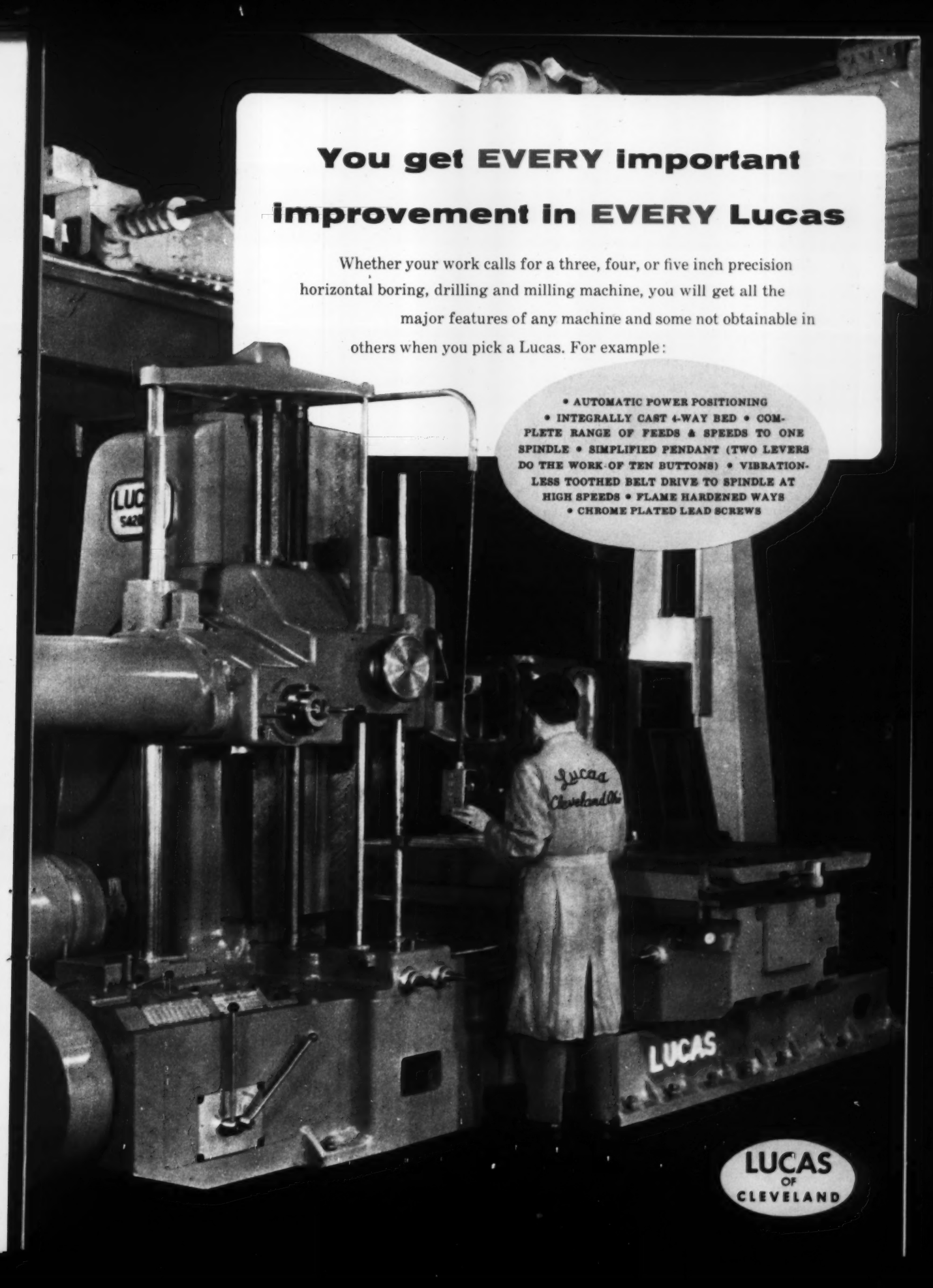
ANTISEP All-Purpose Base

. . . a product of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

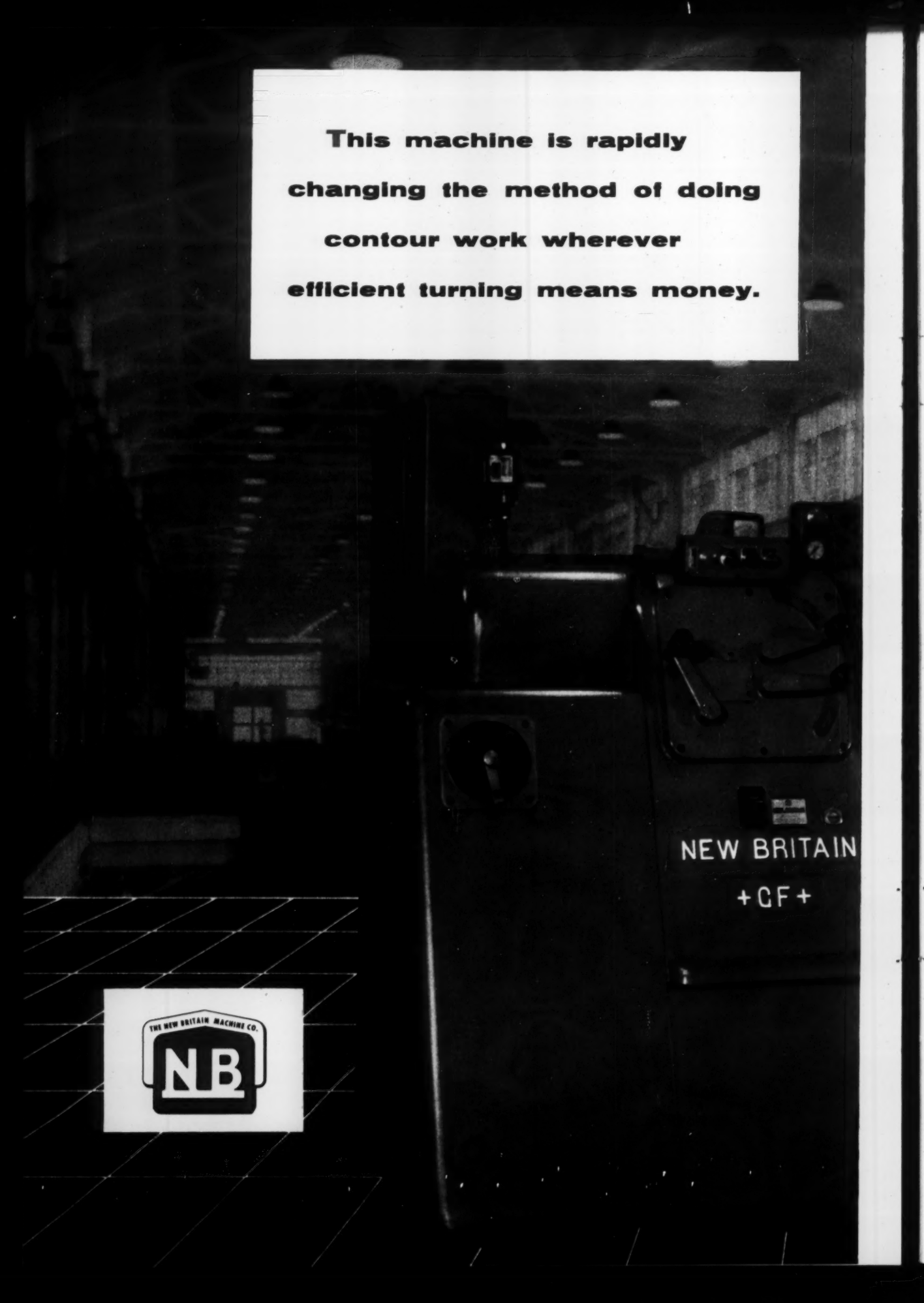


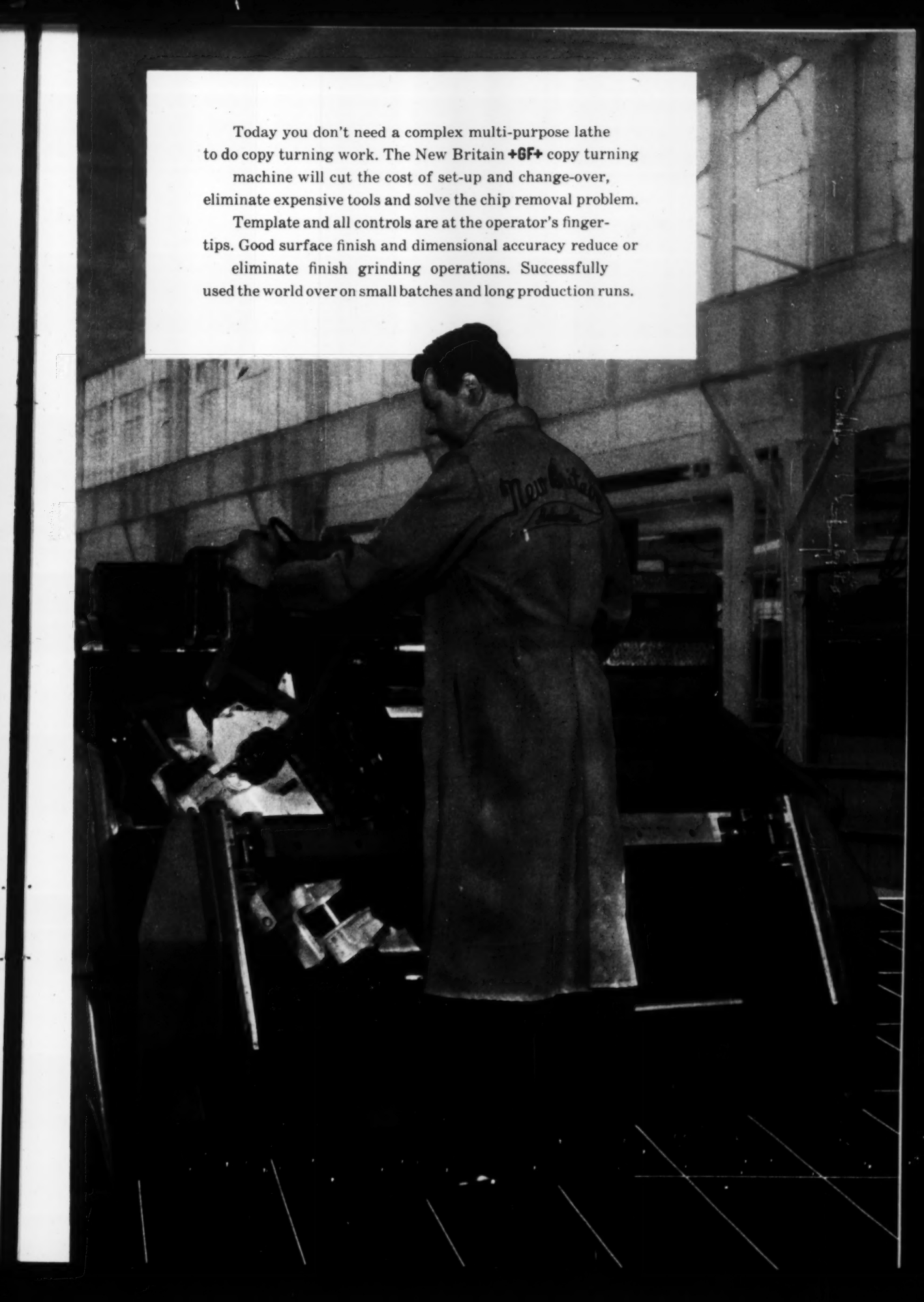
You get EVERY important improvement in EVERY Lucas

Whether your work calls for a three, four, or five inch precision horizontal boring, drilling and milling machine, you will get all the major features of any machine and some not obtainable in others when you pick a Lucas. For example:

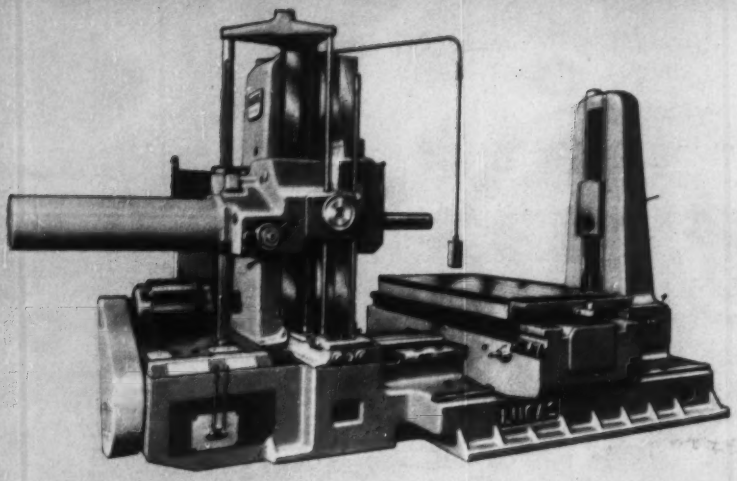
• AUTOMATIC POWER POSITIONING • INTEGRALLY CAST 4-WAY BED • COMPLETE RANGE OF FEEDS & SPEEDS TO ONE SPINDLE • SIMPLIFIED PENDANT (TWO LEVERS DO THE WORK OF TEN BUTTONS) • VIBRATIONLESS TOOTHED BELT DRIVE TO SPINDLE AT HIGH SPEEDS • FLAME HARDENED WAYS • CHROME PLATED LEAD SCREWS

LUCAS OF CLEVELAND


This machine is rapidly
changing the method of doing
contour work wherever
efficient turning means money.
NEW BRITAIN
+CF+
THE NEW BRITAIN MACHINE CO.
NB



Today you don't need a complex multi-purpose lathe to do copy turning work. The New Britain +GF+ copy turning machine will cut the cost of set-up and change-over, eliminate expensive tools and solve the chip removal problem. Template and all controls are at the operator's fingertips. Good surface finish and dimensional accuracy reduce or eliminate finish grinding operations. Successfully used the world over on small batches and long production runs.

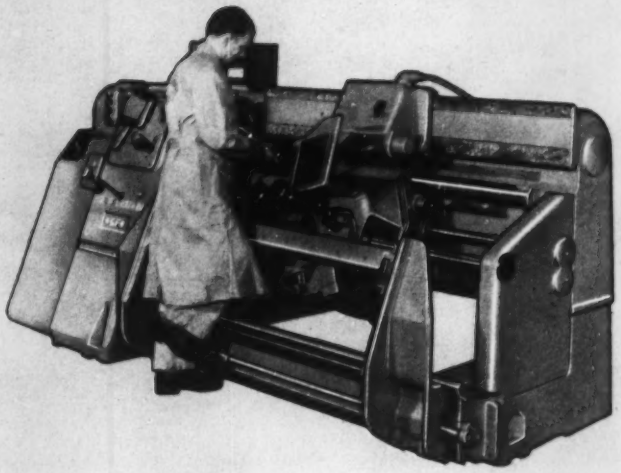


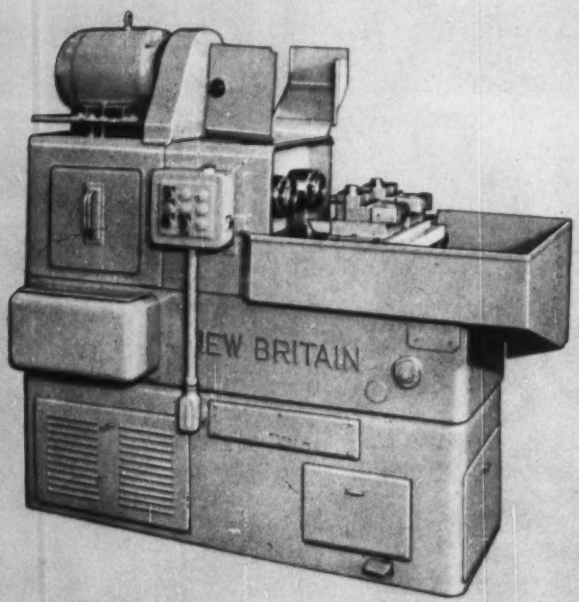
LUCAS PRECISION

A Lucas Precision Horizontal Boring, Drilling and Milling Machine will perform many operations in sequence on one piece or a thousand, from small components to large weldments. It will not only make heavy roughing cuts but will also finish to the close tolerances required in precision manufacturing. Quickly set up for short runs. Incorporates Automatic Power Positioning for multiple operation work.

NEW BRITAIN +GF+

The New Britain +GF+ copy turning machine is built on a new principle with copying saddle mounted below the spindle and on conventional lathe bed. Chips fall free and accumulate through the back of the machine. Power operated tail stock, centralized controls and front mounted prototype or template reduce operator fatigue. Powerful drive and a wide variety of speed and feed ranges make the New Britain +GF+ a profitable producer on short or long runs.





NEW BRITAIN PRECISION BORING MACHINES

include vertical, horizontal and double end models — a complete line for both straight and contour work. New Britain's exclusive application of cam control gives your tool engineer a completely new approach to tooling, for complex pieces. Methods impossible on other types of machine can be employed to speed production, simplify tooling, eliminate finish operations and assure repetitive accuracy on a wide variety of work.

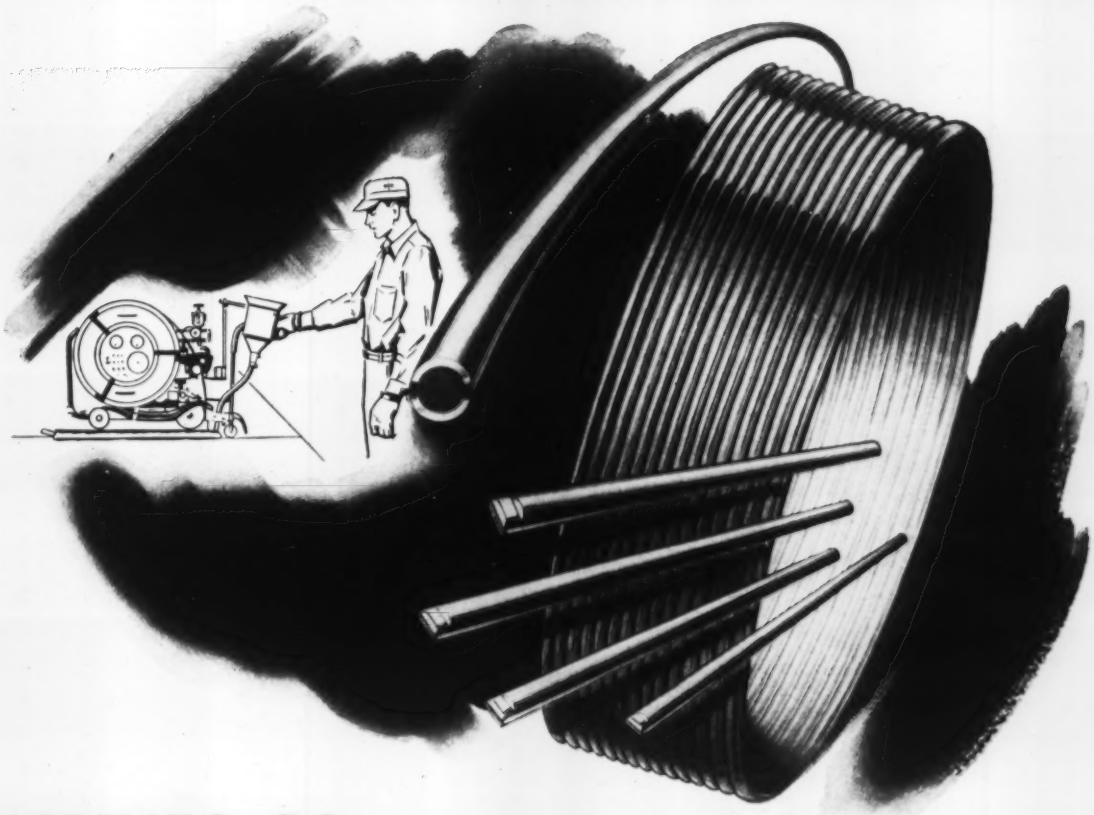
Our general catalog is filed in the Sweet's Machine Tool Catalog File.

N.B LUCAS OF CLEVELAND

AUTOMATIC BAR and CHUCKING MACHINES • PRECISION BORING MACHINES
LUCAS HORIZONTAL BORING, DRILLING and MILLING MACHINES
NEW BRITAIN +GF+ COPYING LATHES

The NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division, New Britain, Connecticut
Lucas Machine Division, Cleveland 8, Ohio



HAYNES 90 alloy now available in tubes and at a MUCH LOWER PRICE

TRADE-MARK

Now you can save even more by hard-facing wearing-parts with HAYNES 90 alloy. This is because HAYNES 90 costs so much less in this new economical tube form. These new tube rods produce sound, uniform deposits that won't crumble or flake off at temperatures up to 1000°F. They provide the same high abrasion, impact, and corrosion resistance—the same dependable protection for your equipment that HAYNES 90 brought to you as a cast rod—and at a much lower price.

For manual hard-facing, HAYNES 90 tube rod comes in convenient 14-in. lengths for easy application with standard metallic-arc welding equipment. For rapid coating of large parts, HAYNES 90 also comes in coils for mechanized hard-facing by the submerged-arc, inert gas, and open-arc methods.

HAYNES 93, HASCROME, and HAYSTELLITE alloys are also available in this economical tube rod form. HAYNES 93 iron-base rod is noted for high abrasion and corrosion resistance . . . HASCROME iron-base rod for high impact resistance . . . and HAYSTELLITE tungsten carbide rod is tops for resistance to severe abrasion.

For more information about these new, inexpensive tube rods and coils, along with other HAYNES long-wearing hard-facing products, contact your nearest Haynes Stellite Company office today.

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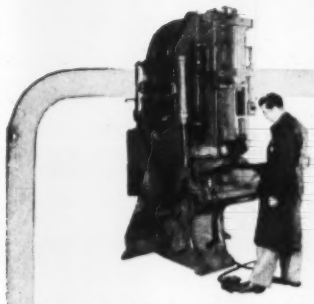
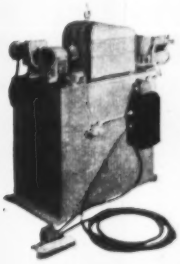


PINES 20-TON BENDING PRESS— Speeds production of automotive tail pipes, completes some jobs 50% faster by eliminating work handling. Up to 10 bends produced in a single progressive operation, most jobs completed in one handling.

PINES SEMI-AUTOMATIC BENDER— Capacity up to 300 bends per hour, for applications where output does not require speed of fully automatic machines. Hydraulic power assures accurate, highly uniform results. Economically tooled, easy for women to operate, requires up to 60% less floor space.



PINES END-FINISHING MACHINE—3" capacity, floor-mounted unit with air clamping. Speeds deburring, facing, pointing, or light hollow mill turning. Available with manual or air spindle advance. Other units also provided for smaller and larger work.

PINES SIZE 4 BENDER— Now cold forms ultra-thin 4" x .020" stainless steel tubes for aircraft to 8" c/l radius. Ability to form these sharp, small radius bends without wrinkles saved $14,000 per plane for an aircraft manufacturer.

● Since 1941, when Pines Automatic Hydraulic Bending Machines were first introduced, more and more plants fabricating tubing, pipe, rods, moldings, rolled and extruded shapes, have found it profitable to standardize on Pines Machines. Dependable accuracy, combined with fast, more efficient operation are two of the major reasons why hundreds of commercial and industrial plants have turned to Pines to find cost-cutting solutions to bending and end-finishing problems. A study of the four examples shown here may suggest how you may profitably take advantage of the latest developments in fabricating the "Pines-way".

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For additional cost-cutting ideas, write today for free copies of "Pines News"—illustrates latest bending and end-finishing techniques applied to actual jobs. And call on Pines engineers for assistance on any job.

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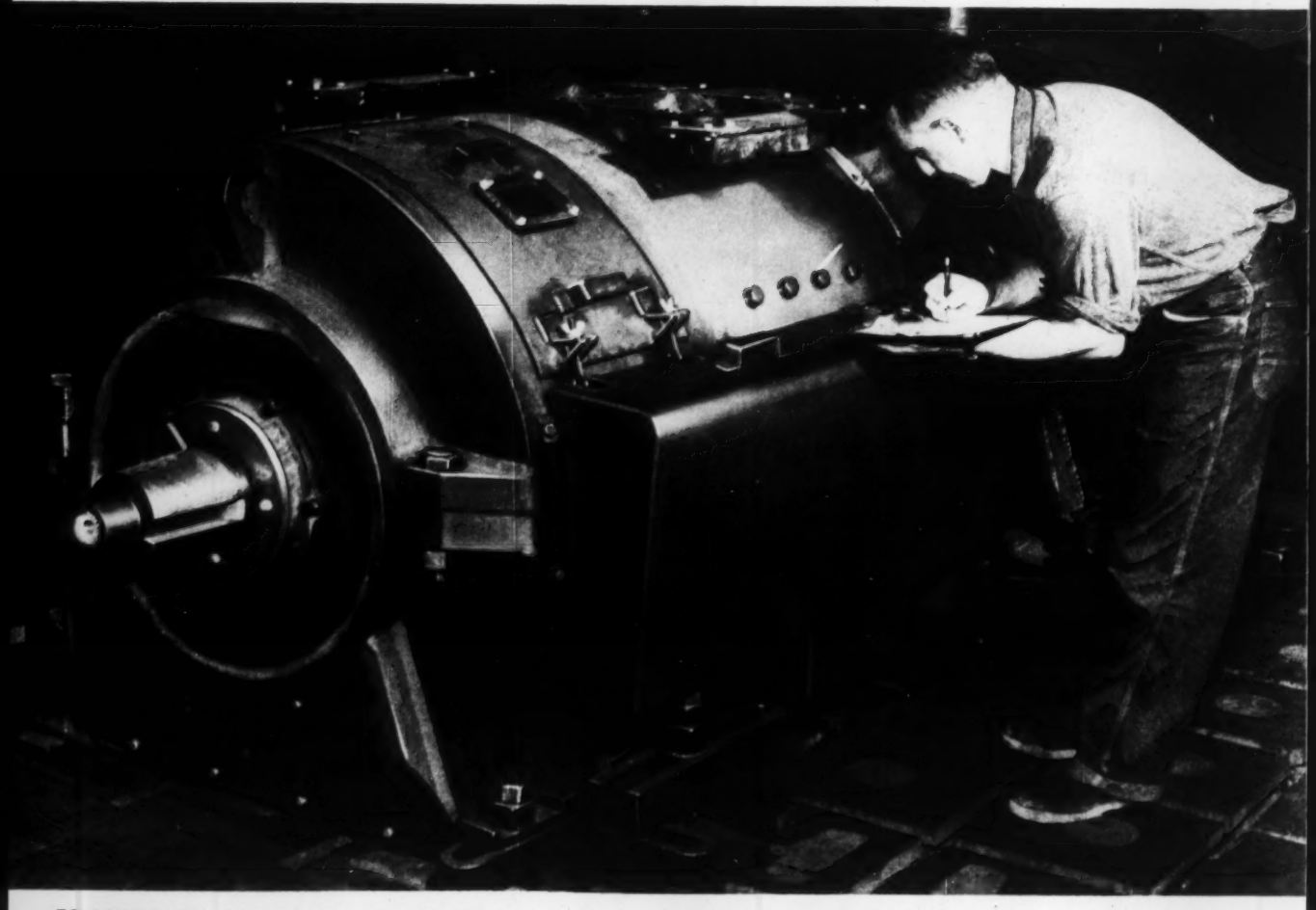
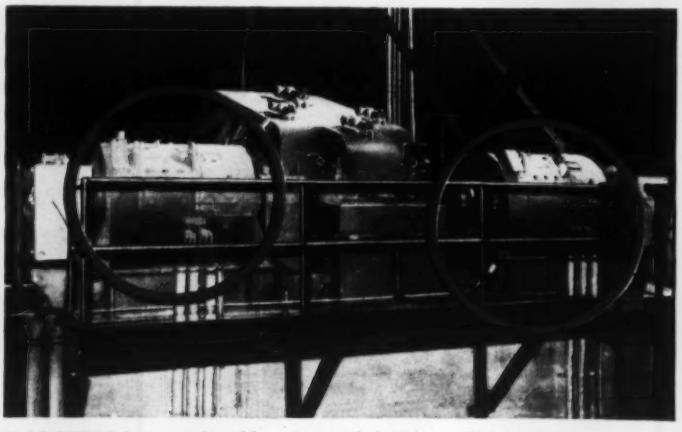
NEW G-E Armored Mill Motor—



TO ASSURE YOU of dependable service, this MD-622 is undergoing the rigid tests given to all G-E Armored Motors before shipment.

POWER SHOVEL equipped with compact G-E Type MD motors which have high overload capacity and the ability to take the terrific shocks of excavating duty.



SLAB SHEAR in reversing, blooming and slabbing mill is typical of severe applications in the steel industry that are dependably powered by G-E armored motors.

Most Powerful in its Class

Another G-E "first"—the MD-622—gives you more horsepower and torque than any other mill motor!

POWER-PLUS for the toughest heavy-duty application—that's the job of the MD-622—General Electric's latest addition to the MD-600 Armored Motor line.

AISE OBJECTIVES set up for smaller motors of this type, are met in the construction of the MD-622, which gives you more horsepower, increased commutating ability and better speed regulation in the same mounting dimensions as the earlier motor. Designed for duty in steel mills, power shovels, mine operations, dredges and ore bridges, it's ideal for extra torque, high momentary loads and snappy reversals.

RATED 500 HP AT 350 RPM when force ventilated, this motor delivers more torque relative to its size than any other mill motor ever built.

BETTER SPEED REGULATION can be maintained at higher speeds than in previous motors—and maximum safe speed is 20% higher.

WIDER SPEED RANGE is possible with the adjustable speed MD-622 and stabilizing series windings are not required, simplifying control on reversing operations.

REDUCED MAINTENANCE due to integral feet on armature. Out of frame, it stands by itself. Armature spider allows replacement of shaft without disturbing windings.

FOR NEW BULLETIN on MD-600 motors, fill out the coupon below. If you need more information, contact your nearest G-E Apparatus Sales Office. General Electric Co., Schenectady 5, N. Y.

Please send Bulletin GEA-4654C, "DC Armored Motors," which gives the complete story on the MD-600 line with examples of their reliable performance throughout industry.

General Electric Co.
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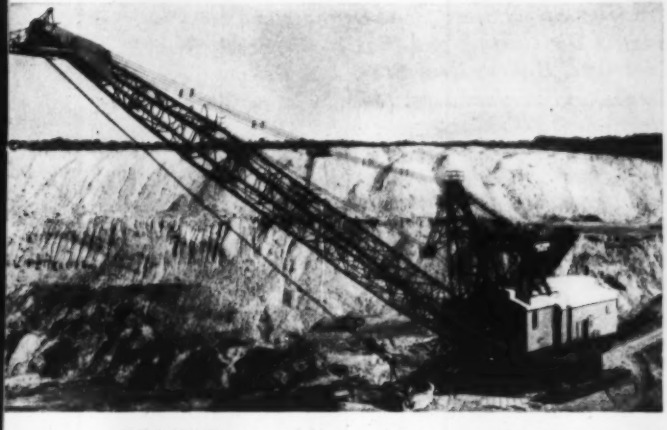
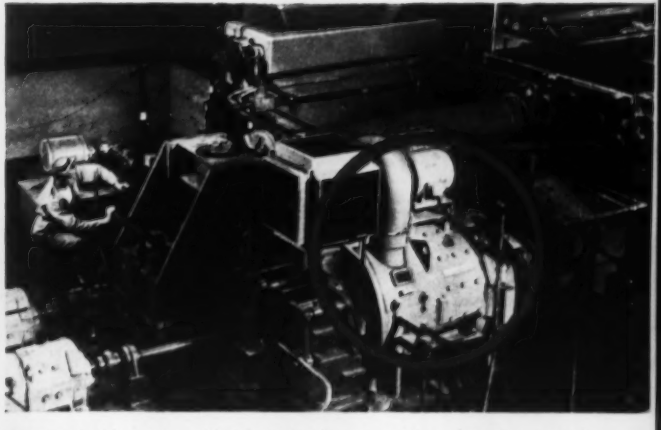
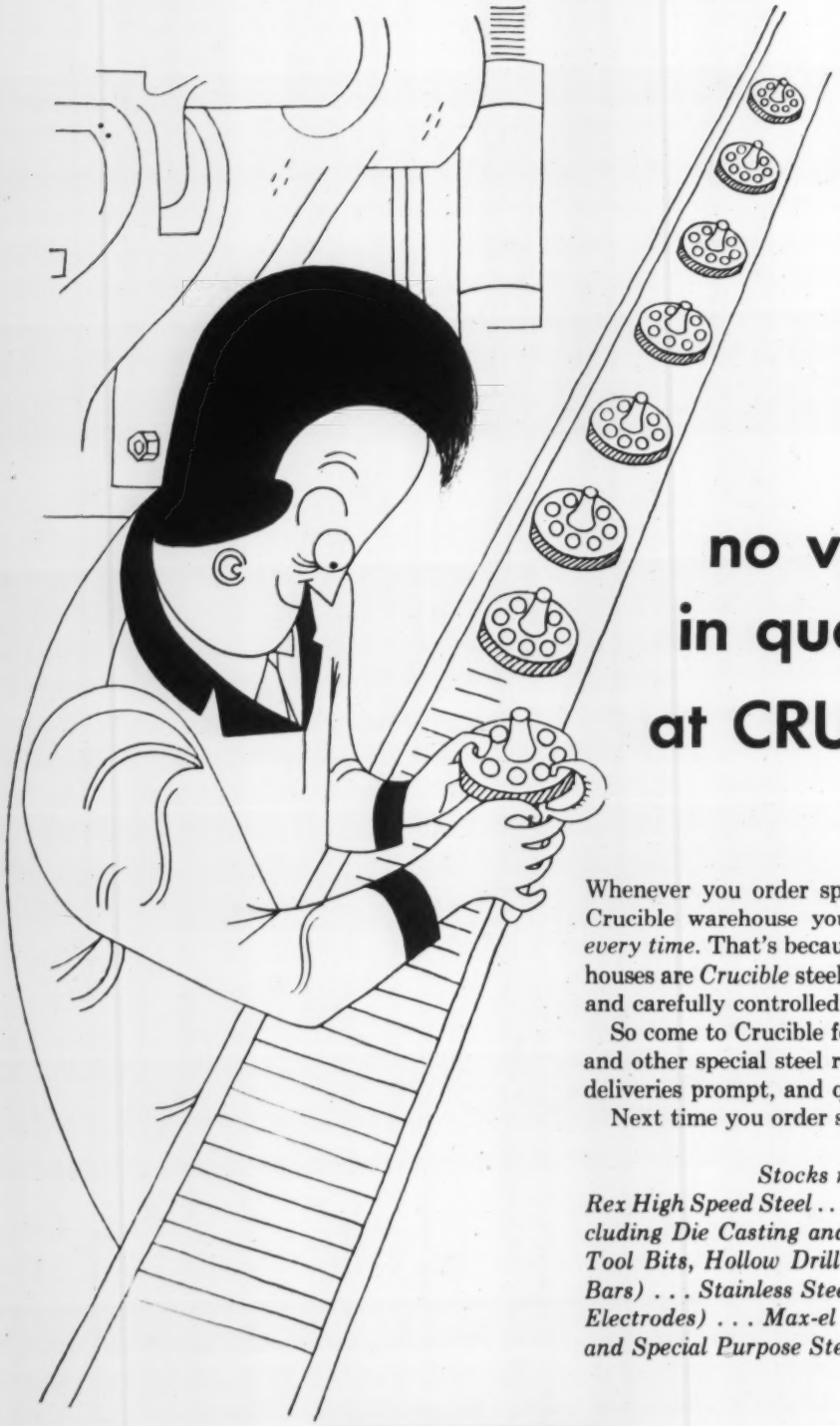


DRAGLINE powered by amplidyne-controlled G-E armored motors—which were selected because of their high torque and quick reversing characteristics.



COILER in hot strip mill driven by force ventilated G-E armored motor with extra horsepower and mechanical strength to withstand severe operating conditions.



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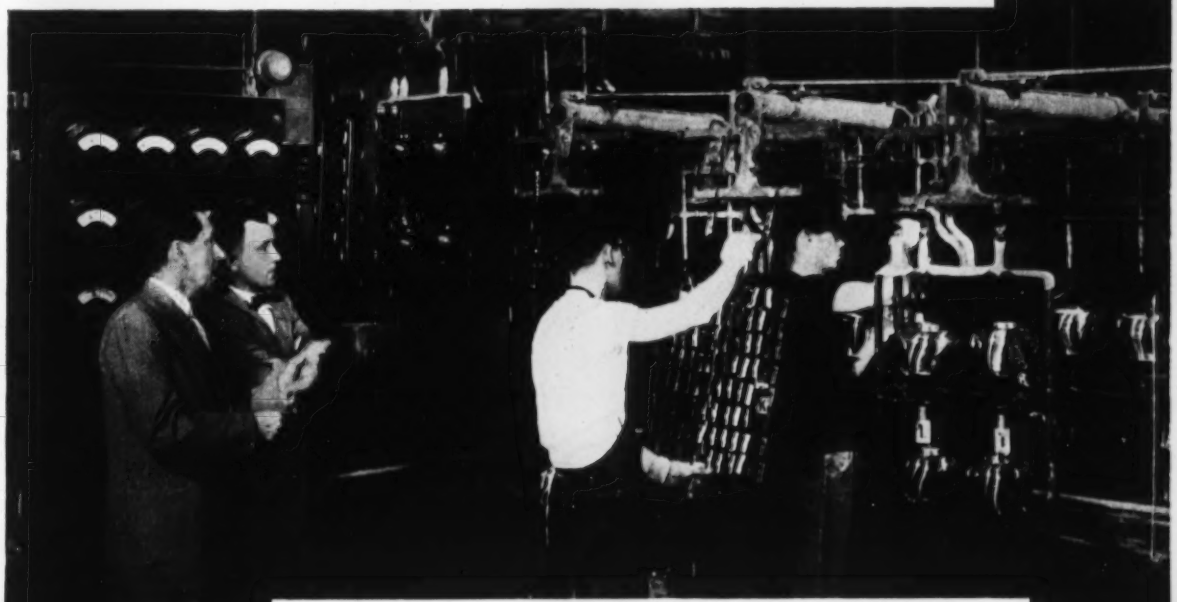
...and here is the double file loading feature of H-VW-M Full Automatic Conveyors



It's easy to see the advantages of this construction—double the capacity with the same machine. When less production is required only one rack is placed on each hanger arm—that's versatility, isn't it?

H-VW-M Full Automatic Conveyors are used daily for all types of plating—as well as anodizing, pickling, cleaning, phosphate coatings, bright dipping, painting, etching, and other finishing processes. They operate in a wide range of weight, current loads, and lifts. And they can be built with delayed set-down for varying immersion time, treatment by-pass mechanisms, air and solution agitation, racks with individual electrical control for each rack, or whatever special equipment the job requires—the ideal solution to problems of large quantity, high quality plating.

Full Automatic Conveyors are only one of many results of H-VW-M's more than eighty years of constant electroplating development. It's a continuous policy, best summed up in H-VW-M Platemanship...your working guarantee of the best that industry has to offer—not only in plating conveyors—but in every phase of plating and polishing.

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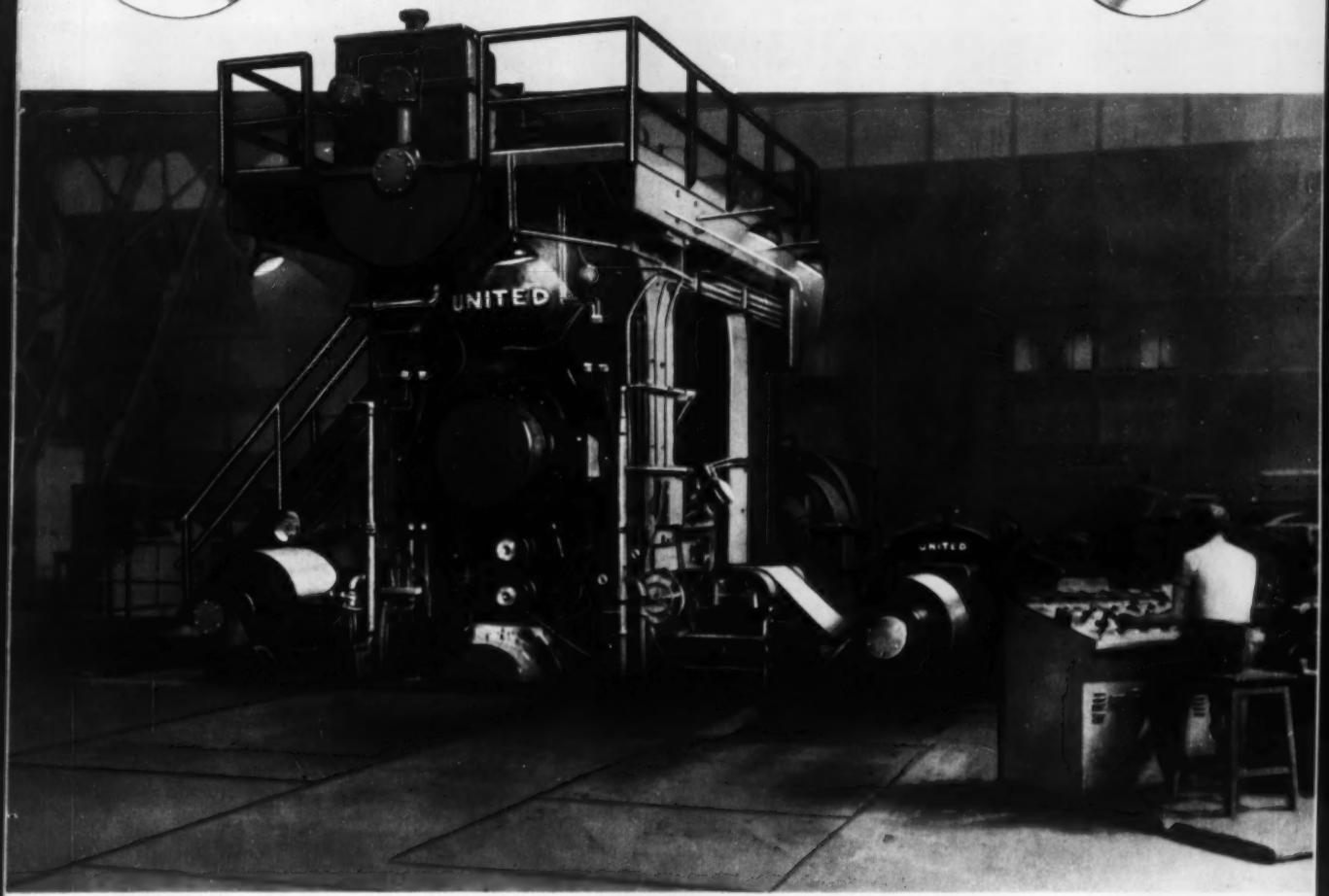

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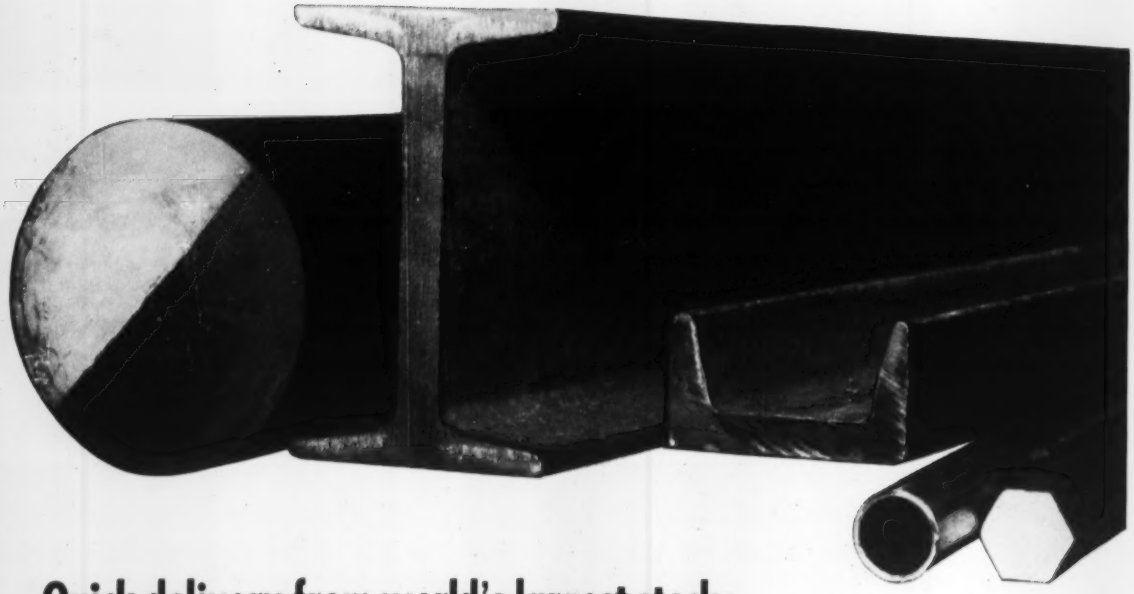

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STEEL

December 6, 1954

Metalworking Outlook

Big Push for Stainless

Reports have it that Republic Steel Corp., U. S. Steel Corp., Armco Steel Corp. and Allegheny Ludlum Steel Corp. will supply stainless steel to clad the new Socony-Vacuum building in New York. Nobody involved will either confirm or deny the reports. The structure is a 42-story building with 1.6 million sq ft of space for some 10,000 people. It will be the largest metal-clad structure ever to be built anywhere. The development could mark a major step in the steel industry's drive to boost architectural uses of stainless. It also may be the signal for three or four more stainless-clad buildings to be erected around the country. The builder of the New York job, for which the steel companies have reportedly supplied some of the financing, is John W. Galbreath & Co. Inc., Columbus, O., realtor.

Auto Prospects

Look for 5.8 to 6 million autos to be produced in the U.S. in 1955. Some 5.4 million will be assembled this year. About 1 million trucks will be built in 1954, but that total probably won't be matched next year. Some 900,000 to 950,000 may be turned out. The big 1955 production months will likely be in the first half, as the auto companies work feverishly to produce as many units as possible in case of a big strike next summer.

Pinch for Platers

The present push on auto production is hitting platers because they can't get enough nickel. Although nickel supplies promise to improve throughout 1955 (p. 73), the platers have been getting steadily less for the last three or four months. That's because stainless producers have been taking more as business improved. Another worry for platers: Should they pass along or absorb the recent price increase in nickel? Auto companies, of course, are applying heavy pressure on them to absorb. Platers will probably do so on smaller items, but may have to pass on at least part of the boost on products like bumpers that take a heavy plating. One help is that some nickel wholesalers won't charge platers the higher prices until January shipments.

Change in Tactics

The Reuther-McDonald feud won't come out in the open much at the CIO convention which begins today (Dec. 6) in Los Angeles. United Steelworker President David McDonald once apparently was going to press for a full-time man as president of the CIO. That would aim right at Walter Reuther who straddles two jobs, presidencies of the CIO and the United Auto Workers. Now that a CIO-AFL merger appears possible and the question of the CIO presidency is more academic, Mr. McDonald won't press the matter. AFL Chief George Meany is the most likely candidate for president of the CIO-AFL combine.

Small Business Gains

Is small business slipping? No, says the U.S. Chamber of Commerce. It points out that the net incomes of the 100 largest industrial corporations

before taxes dropped from 3.7 per cent of the national income in 1929 to 3.3 per cent in 1948. But medium-sized companies increased their share from 4.8 per cent to 7 per cent. Small firms boosted theirs from 0.6 per cent to 1.5 per cent.

More Leasing

More capital equipment builders are modifying their sales financing arrangements. Norton Co. will soon lease certain standard grinding and lapping machines under arrangements similar to the Kearney & Trecker Corp. setup. It has also new trade-in and time-payment plans. Van Norman Co. announces a program with C.I.T. Corp. which provides for long-term leases and 10-year installment purchase payments on its machine tools.

Tool Reserve To Climb

A new controlled-disposal program for surplus government equipment (p. 80) will bring more tools into the National Industrial Equipment Reserve. NIER is a stockpile which complements the Army, Navy and Air Force Industrial Equipment Reserves. Equipment in the latter three pools is for production of military end-items. That in NIER is for essential civilian and defense-supporting industries in time of war. NIER presently contains some 4000 pieces of general-purpose equipment, of which 1300 are machine tools.

A Plan for Asia

The President will ask Congress in January to authorize a long-range economic development program for Asia. Details, particularly on the extent which government or private capital should be used, are being discussed at the cabinet level. Current talk is of increasing the present outlay for military and economic assistance to Asia from $1 billion in the present fiscal year to $2 or $3 billion annually over the next 10 years. All free nations in Asia, including India, would benefit.

Straws in the Wind

The British are pressing U.S. officials for more trade with Russia . . . The President's $50-billion highway proposal has not been whittled down by Gen. Lucius D. Clay to $24 billion as some reports have it; he proposes that the U.S. supply $24 billion of the $50 billion and that the remaining $26 billion be provided by the states . . . "Stockholders Protective Committee" for some share owners of A. M. Byers Co., Pittsburgh wrought iron firm, seeks to oust the president, elect new officers and investigate a loan made in 1951 to Midland Coke Co., a subsidiary of Crucible Steel Co.; Byers' president, A. B. Dastrup, says the loan was fully explained at the time it was made, and he charges deliberate misrepresentations by the committee of Byers' earnings and fiscal policies.

This Week in Metalworking

The government stockpile program is doing more jobs than originally intended (p. 74) . . . Military spending for hard goods is picking up (p. 75). . . Gearmakers are gearing up for better business in 1955 (p. 77) . . . Metal spinning is an old art that's finding new production uses (p. 78) . . . A revitalized West Europe finds the way to peaceful prosperity (p. 84).

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FOR METAL

Embossing Adds Glamour To Metal

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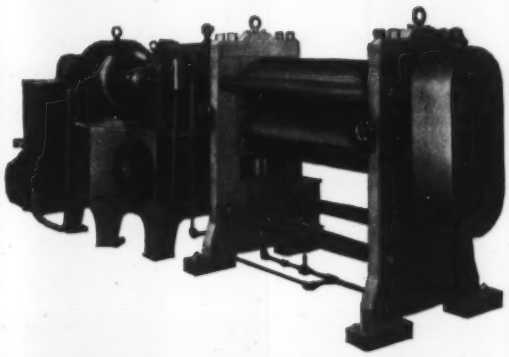

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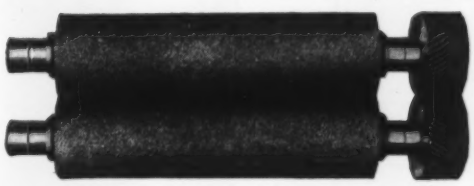

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USS "T-1", A Nickel Alloy Steel, Helps Save Money

Lips of Nickel Alloy Steel show 11 times the life of the previous material used . . . in Clamshell Bucket

T-1 steel not only replaced a more expensive material here, but also outlasted it by 11 to 1. In this application, T-1 is still on the job after 11 months, handling open hearth sinter, whereas a wear resisting steel cracked and failed in 30 days under abrasion, impact and operating temperatures of 500 to 600°F.

4 to 1 Better Service than carbon-manganese steel . . . in Skip Car Bottoms, Sides and Bail Plates

On skip cars handling coke, ore and limestone, T-1 steel bottoms, sides and bail plates are saving money. So far they have outlasted carbon-manganese steel 4 to 1. This four-fold longer life means more use per dollar for T-1 steel even though its initial cost is about twice that of the steel it replaced.

Unmatched Performance under heat and wear . . . in Blooming Mill Conveyor Chain

Here's a 40" blooming mill conveyor chain for lifting hot slabs at U. S. Steel's Ohio Works. Various materials used for chain failed under the severest impact conditions imaginable, caused by falling or jammed hot slabs. Notice the good appearance of the present chain made from T-1 steel. This product has far outlasted all previously used materials.

These applications in U. S. Steel's Ohio Works show how T-1 steel can reduce your maintenance, operating and repair expenses under like conditions. Write for complete details.

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THE INTERNATIONAL NICKEL COMPANY, INC.

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Time for Planning!

Not too many months ago, you will recall, some people were worrying too much about business, doing too little constructive planning.

They figured the U. S. would slip from a post-Korea inventory adjustment into a creeping recession. Then perhaps into the slough of depression.

They reasoned: Industrial production could be expected to slip badly. Thirty-cent copper inevitably would drop under the weight of mountains of Chilean metal. Families—running for cover—couldn't be expected to keep on buying a million new houses a year. And, they'd stop buying television sets and wait for color.

Nothing like that happened.

Industrial production has fluctuated within a narrow range of two points on the FRB index. That's 9 per cent under the 1953 peak but about even with 1952. Copper deliveries are the highest in a year and a half. The price didn't break.

Steel companies will produce 88 million tons of steel in 1954. Their customers have used 8 million tons out of inventories.

Metalworking industry sales of $111-112 billion will be second best only to 1953's. Reports coming in to STEEL's editors from a thousand metalworking executives indicate 1955 could be $10-11 billion better.

Individual consumers have continued in a buying mood during the recent business adjustment. And, with justification. Personal disposable income, thanks to lower income taxes, is running $3 billion a year ahead of 1953's.

This year, people bought a record 1.2 million homes and want an equal number in 1955. They aren't waiting to buy television sets or major appliances or automobiles. Christmas sales are breaking all records.

There's plenty of evidence that business is better; that the resilience of the American economy under near-peacetime conditions is nothing less than remarkable.

There's just as much evidence that it's time to think big and plan big for your share of the still better business in 1955.

Irwin H. Such

EDITOR

PAPER SALES: At first glance papermaking would appear to be far afield from metalworking. Actually, the modern paper industry represents a large and continuously growing market for a variety of metal products.

Since World War II pressure has been on

papermakers to increase output of all types of paper products. The paper industry responded by increasing its capital investments in an almost steady rise from $116 million in 1945 to $448 million in 1954. Over the same period capital investments by all manufacturing industries went from $3983 million to $11,332 million. Totaling up the accumulated capital investments by the paper and allied products field from 1945 to 1954, the amount comes to almost $3.5 billion —about 4 per cent of total expenditures for capital improvements by all American manufacturing concerns in this period.

There are heavy metalworking sales to be wrapped up in the paper industry—proof that metalworking, the world's largest industry, reaches into virtually every segment of America's economy.

OPERATION OUCH: The O. Henrys of the expense account are feeling a two-way pinch. Tax collectors are taking up where cost-conscious employers leave off (p. 76).

Travel and entertainment costs are getting special attention. It's not the nature of the expenditure but its relation to business purposes that determines tax deductibility. Treasury men use this test: Is it an ordinary expense (usual within the trade) and is the outlay necessary (is it appropriate and helpful to the particular business)?

Another change: At-home expenses fall under a new rule. They can be deducted if the expense accounter is not reimbursed. If he takes a customer to lunch in his home city, he may: 1. Deduct what he spent on the customer. 2. Deduct the "extras" he bought for himself: What his lunch cost, minus what he usually spends for lunch.

FIRM FUTURE: Gearmakers are enjoying one of their best peacetime years. John Sears, secretary, American Gear Manufacturers Association, estimates 1954 sales will hit $250 million. The outlook for next year is even brighter (p. 77).

Demands of the automotive, steel, construction, machine tool and paper industries are expected to be on the rise, and several new markets—aviation, marine propulsion and automatic equipment—look especially promising.

Says a Pennsylvania gearmaker: "In the last two months, Pittsburgh mills doubled their inquiries on gear work. They will need more gears for maintenance next year. With industrial inventories lower than a year ago, sales have no place to go but up."

PROFITABLE MERGER: There weren't any shotguns in evidence at the wedding described on p. 116. It was love at first sight, and both parents, plastics and metals, stand to gain a brand new market. Combination of the protective and decorative qualities of vinyl plastic with the strength and rigidity of metal could be the answer to application shortcomings of both.

But the emergence of this new laminate on the scene is significant for another reason. Instead of casting competitive brickbats at each other (as was expected), alert men in both the metals and plastics industry saw a chance to better their profits through the combination of their respective strong points.

In the final analysis, all materials gain by the competitive process of each moving into its best and most economical uses. It's the smart enterpriser who recognizes when an entirely new material is more salable than either his or his competitor's.

A FOUNDRYMAN ON FLAWS: Some foundrymen are still reticent when the subject of flaws is up for discussion. They shouldn't be. Designers are aware that castings without flaws are rare and generally can allow an ample safety factor. What they need to know is whether the size, shape and distribution of internal or surface flaws exceed specified limits.

That's where the troubles arise. Casting inspection is covered thoroughly by several specs. But, as the article on p. 158 points out, pricing practices that may result from these specs can and do turn some designers away from castings.

Cooper-Bessemer's T. E. Eagan also covers some of the problems caused by welding of defects in the fourth and last part of his series on the cast ferrous metals. His theme points up a basic need: Better understanding between foundry and customer. And its frankness suggests that foundrymen are out to achieve it.

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replaces 3 trucks and releases 6 men for other work

● A Traveloader is used by Kyle-Taylor Lumber Company, Berwick, La., to transport pipe from river dock to storage. It has replaced two pipe trailers and a gin-pole truck formerly used on this job, reduced man-power required from 15 to 9 and made time savings of about 70%.

This company, serving oil producers, receives pipe in barges at the river dock. A truck crane unloads and places the pipe on the dock. The Traveloader picks it up five lengths at a time, transports it to the storage yard, and stacks it neatly on racks for further disposition.

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Since the company operates 24 hours, 7 days per week, the cost savings are substantial. Moreover, 6 more workers were made available without increasing payroll, and two less mechanized units require maintenance. "This machine is by far the finest that I have seen for handling pipe. It has doubled our capacity with less labor," says Mr. J. E. Kyle, Jr., Vice President.

Write for Bulletin 1360. It completely describes the remarkable TRAVELOADER that carries like a straddle truck, delivers like a road truck, and stacks like a fork truck. The Baker-Raulang Company, 1259 West 80th Street, Cleveland 2, Ohio.

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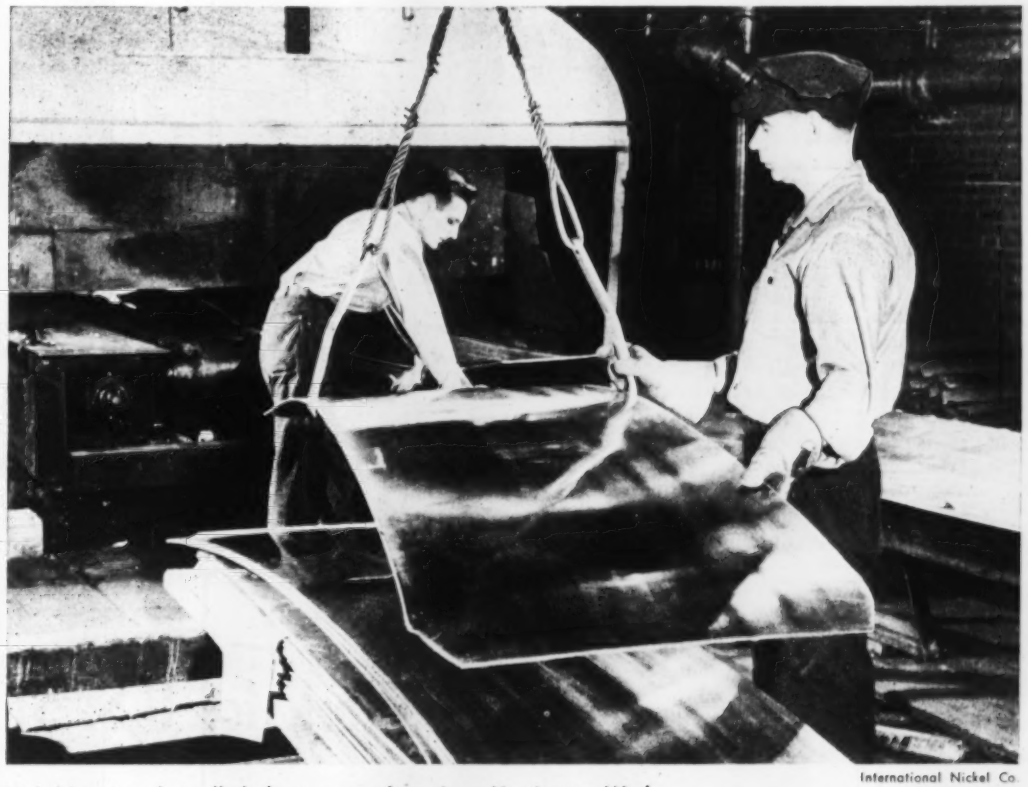


International Nickel Co.

Nickel-bearing, hot-rolled sheet comes from Inco Huntington Works

Nickel: More of It But Costlier in '55

NICKEL USERS and their customers can expect to get more nickel in 1955 than in 1954. But both are faced by rising prices.

The 4.5-cent-per-lb hike on electrolytic nickel announced by International Nickel Co. Inc. will put pressure on prices beyond the actual amount of the increase. Many rollers and fabricators of nickel-bearing metal have absorbed recent labor cost hikes.

Another factor is that some consuming industries can afford increased prices better than others. Some shifting in nickel consumption patterns may result.

All Out—Electroplaters probably will be undeterred by the price hike. They're still generally nickel-starved. Proof: Platers are paying from $1 to $1.25 per lb for gray market nickel anodes compared with about 85 cents for those from legitimate sources.

Price increases will probably not be made on smaller plating jobs. Heavy-deposit jobs, particularly in the automotive trade, may require the nickel price hike to be passed through, however, and passed on to the customer.

Not So Fast—Stainless and alloy steel producers, however, will take a longer look at the nickel price hike before making their move. Earlier this year stainless people did not take anywhere near all the nickel available to them. Reason: Demand was slow, but within the last two or three months, it picked up, and both stainless and alloy steel producers began taking all the nickel they could get.

The question is whether the present lift in the market would be hurt by rising stainless and alloy prices caused by nickel price hikes and/or other increased costs. Chances are, price hikes would affect volume. Producers will proceed slowly, but they will probably come up with some increases. As one steel executive put it: "We don't want to cut ourselves out of any sales, but our profit margin was cut by the wage increases of last summer . . . If our raw materials suppliers raise their prices,

WORLD NICKEL PRODUCTION

(net tons)

1955*	198,500
1954*	176,000
1953	159,520
1952	163,580

*Estimated by STEEL.

we generally must follow."

Same Story—Producers of such nickel-using nonferrous alloys as nickel silver and cupro nickel will have to "pass on at least that price hike" because they have absorbed labor increases. Latest settlements in the brass industry were for an 8 to 8.5-cent package. Industrymen here don't believe the nickel increase will drastically affect their business; they're sorry to see the hike come but figure it's justified.

Though Inco holds out little prospect of being able to increase nickel shipments to the U. S. in the near future (because of heavy free world demand), the nickel supply picture is somewhat brighter for 1955 than for this year. Biggest boost may be an increase up to 15 per cent in supplies available to civilian users because of slippage in defense take. Other reasons for increased supply:

Growing Sources — Deliveries from the Sherritt Gordon mines in Canada to the U. S. civilian industry have amounted to 1.5 million lb during the last three months. When SG gets into full production, an additional 17 to 18 million lb of nickel will be forthcoming. After stockpile commitments are taken care of, about 7 million lb yearly of that output will be available to commercial trade as of next year.

Nicaro has been adding about 500,000 lb a month to civilian use (oxides for steel mills), and in the absence of new government directives, about that amount can be counted on. Nicaro capacity today is about 28 to 30 million lb, to be expanded to 49 million lb by 1957. M. A. Hanna will begin delivering nickel to stockpile at the rate of 12 to 14 million lb a year in 1955. Falconbridge Nickel is also going to increase shipments next year.

Totting Up — Altogether, free world production may be as much as 500 million lb of nickel a year by 1960 compared with 350 to 400 million lb a year currently, with much of latter going to stockpile, of course.

Nickel men point to this growth as a good reason for not designing nickel out of your product. It may be one of the last metals to reach a balanced supply, but the day of balance is coming.

More Work for U.S. Stockpile

STOCKPILING — a government program originally cast to play an emergency role—is getting bigger billing:

1. It's providing a cache of strategic and critical materials in case of a war.
2. It's stimulating development and expansion of certain domestic industries.
3. It's helping to bail out certain industries in economic distress.

New Tool—The third role is the newest, and the one which merits increasing attention from all industry. Although its impact has been minor, the stockpile program has developed into an economic tool.

Take the recent copper strike and its temporary metal shortage, for example. Many companies in late October faced reduced operations and even complete shutdowns because supplies had run out due to the strikes. After the strike settlement, the government made 51,500 tons of the red metal available for fourth-quarter consumption to firms "facing shutdowns for lack of the metal."

Detour — Significance of this measure was the method in which the "defense need" provisions, which permit release of materials for defense requirements only, were circumvented. The reasoning: Since the copper destined for national stockpile had not been transferred, it was not subject to normal stockpile withdrawal regulations.

Noteworthy, too, is the fact that the government waited until the strike had been settled before releasing the copper, avoiding any chance for "strike-breaker" and "union-buster" charges.

Chilean Situation—That was the second copper move by the government this year. At midyear the government bought up 100,000 tons of Chilean copper for stockpile. The announcement, even before a cent had been spent, served to advance prices one cent. But the stockpile move gave domestic producers an opportunity to work off inventories which had grown while buyers were watching the Chilean situation for a possible price break.

The administration's policy regarding lead and zinc provides further evidence of the economic impact possible in the stockpiling pro-

gram. In August, to rescue this industry from its economic ills, the purchase for stockpile of 300,000 tons of zinc and 200,000 tons of lead was authorized for the current fiscal year. When the first call for metal went out in September, prices edged upward.

Door Is Open—Now, reason observers, the way is open for the government to take similar action with any of the 93 materials on the stockpile list, among which are aluminum, nickel, tungsten, tin, manganese, chrome, mercury and titanium.

Here's how the program has evolved. The 79th Congress set up the national stockpile to include materials bought largely from foreign sources that might be cut off in time of war—this is called the miminum stockpile program and comprises 75 items. This year a "long-term" stockpile program was developed, aiming to make us self-sustaining even when cut off from foreign sources. It comprises 18 items.

Feeders—In addition to direct stockpile procurement, there are two other feeders:

1. The Department of Agriculture has a program in which it can barter surplus farm goods for critical and strategic materials for stockpile.

2. Materials can go to stockpile from the Defense Production Act program which has guaranteed market clauses as part of its incentive to stimulate domestic development and production of such items as tungsten, manganese and chrome.

Adding the "aid to distressed industries" factor to the stockpiling program gives it more political potency.

Votes and Friends—The Chilean copper deal kept the metal off the market and enabled the administration to continue its support for liberal trade policies—a reduction of imports due to high tariffs means losing friends abroad. At home, mine shutdowns can mean a loss of votes at election time, and it's conceivable the stockpile program aid might occur at such opportune periods. The businessman also can put in a bid when it's apparent that stockpile policy might divert for civilian use some items going to defense.

Defense Ordering Step-Up Begins

Procurement of military hard goods is behind rate needed to fulfill estimates for fiscal 1955. Elephant tool program starts

THE NEW LOOK in military procurement took shape in midsummer, but its effects are just beginning to be felt: There will be more defense orders for military hard goods during the rest of fiscal 1955.

The Defense department took on obligations of $2.3 billion for hard goods in the first quarter of the current fiscal year which began last July (see table below). Estimates are that obligations for hard goods in all of 1955 will go over $10 billion, which means ordering will be stepped up from first-quarter levels.

Maybe Higher—Some of the predictions are for obligations as high as $15 billion. That would mean a still higher pace for orders during the rest of the year.

Actual spending for military hard goods during fiscal 1955 will run ahead of new obligations. Expenditures of $16 billion estimated for the year will be the lowest since 1952, but still substantial compared to 1951 when spending for hard goods was only $5.4 billion.

Next Year — The increase in hard goods spending should continue into fiscal 1956. Defense Secretary Charles Wilson says his department will ask for somewhere between $29.6 billion it got this year and the $34.5 billion received in the previous year. The amount to be asked for depends on some important decisions still to be made. Mr. Wilson's budget estimate is somewhat under the $35 billion some sources predicted he would ask for. Total defense spending next year is expected to continue at close to the $35.5 billion estimated for this year.

A $100-million melon soon will be cut up among machine tool builders. The money was appropriated by the 83rd Congress for the reserve tool and facilities program and was approved by the President and the secretary of defense.

Elephants—Most of the money will go for long lead time elephant tools for mobilization reserves. Military departments have been authorized to go ahead with their approved projects. Most of the procurement will be made through normal purchasing channels.

Lists of the type of production equipment to be purchased have been classified as security information.

How Spending for Military Hard Goods Is Changing

FISCAL YEARS	NET OBLIGATIONS	EXPENDITURES
1955	$10 to 15 billion	$16.0 billion
(YEAR ESTIMATE) 1955	2.3 billion	3.2 billion
(FIRST QUARTER) 1954	5.6 billion	18.2 billion
1953	21.1 billion	20.2 billion
1952	33.0 billion	15.5 billion
1951	26.1 billion	5.4 billion

Taxes, Thrift Converge on Expense Accounts

Treasury men are taking up where tightened company purse strings leave off. Travel and entertainment expenses are number one targets

"THE OLD SWINDLE SHEET" as we once knew it is on its way out.

Symbol of a free-wheeling, high-spending, flush business era, the company expense account—beneficiary of some of the world's most imaginative fiction—is now the ward of tax attorneys.

Scrutiny — What cost-conscious management isn't doing about expense account regulations, the tax collectors are. Under Treasury department policy, few loose practices will pass the unblinking eye of revenue agents without challenge. Especially vulnerable are travel and entertainment costs, for which there is no automatic tax deduction. Such creative effrontery as listing of a fur coat and diamond necklace under jig and fixture expense (it's been done) is a short cut to tax suicide.

In general, all employees are paid for reasonable out-of-pocket expenses incurred in effectively carrying out their work. Studies of the over-all expense cost to business haven't been successful because "the big ones get away." One statistician estimates $2.5-3.5 billion in expense money never shows up on tax returns.

Breakdown—Expense policy depends on the organization chart as much as anything. Owners, officers and top executives are expected to write their own tickets, have wide discretion in spending company money. Their expenditures get close scrutiny from Treasury men. The middle management echelon generally has fewer expenses, which are approved by an immediate superior and often the company controller or treasurer. Third are miscellaneous company employees with occasional need for spending company funds.

Criteria—It's not the nature of expenditures but their relation to business purpose that determines their tax deductibility, says Dr. Henry Bund, executive editor, Research Institute of America. A newly issued RIA report warns: "Travel and entertainment expense deduction is now the number one target of attack by all examining revenue agents."

Every travel and entertainment claim is subjected to this test by Treasury men: Is it an ordinary expense (usual within the trade or business community), and is the outlay necessary (is it appropriate and helpful to the particular business)?

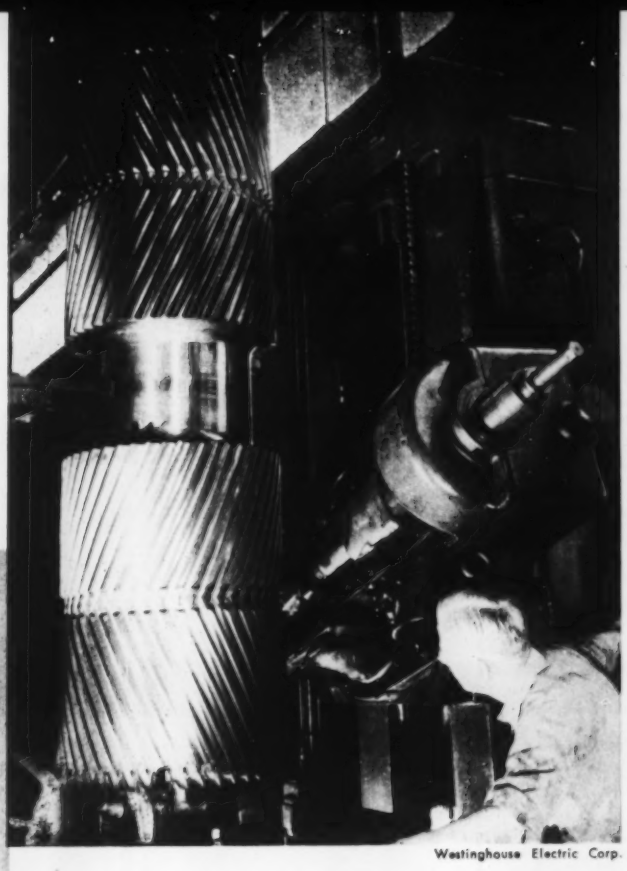
The 1954 tax law revisions have brought several changes to accepted practices. Examples: Under the 10 per cent optional deduction allowance, salesmen formerly could deduct only expenses incurred away from home. Now they can deduct expenses while in their home city, if not reimbursed.

The Right Policy—While executives are not expected to suffer financially, neither are they expected to gain personally from use of company expense accounts. Management's problem is to control expenditures on the company's behalf without interfering with a man's efficiency or ego. Many companies instituting expense account reforms find what they take off in expense allowances must be made up in salary. A universal conclusion by expense account experts: Wise use of the expense account depends on seeing that policy is fully understood and properly administered. The rest is up to the tax attorneys.

Backed by the certain knowledge that more than $2.5 billion in expenses doesn't show up in tax returns each year, the Treasury Department is getting tougher. Here are some things you can do to protect your company from challenges by the Internal Revenue Service.

1. Make a thorough study of Treasury requirements.
2. Formulate your expense account policy to meet these requirements, with a complete explanation to all personnel of expense account status.
3. Double-check upper management first. Top executives often write their own expense account ticket and rate closest Treasury scrutiny.
4. Require all other personnel to keep proof of what they spend, where and why against tax-collection time.
5. Reserve your most jaundiced eye for travel, entertainment claims. Here's where the relation of expense accounts and business purpose is most often stretched.

Gears: Low Inventory Levels Will Shift Sales Into High Next Year



Westinghouse Electric Corp.

GEAR SALES

(1947-1949 equals 100)

1954	140*
1953	166
1952	140

Source: American Gear Manufacturers Association.
*Estimated by STEEL.

ONE OF THE BEST peacetime years in history—that's the report from gearmakers for 1954. This year's sales will total $250 million, estimates John Sears, secretary, American Gear Manufacturers Association, Washington.

Hectic Korean war expansion brought 1951 sales to an all-time high, virtually seven times the 1935-1939 average. This year's sales will be four times greater than the 1935-1939 average.

More Sales Ahead—The outlook is bright. Richard B. Holmes, AGMA president, reports: "Gear manufacturers find their industry is strong, vigorous and growing. While 1954 bookings are somewhat below those of 1953, they compare favorably with the general business level. Present trend is slightly upward."

Specifically, he predicts that automotive, steel, construction, machine tool and paper industries will use more gearing in 1955 than they have this year. On textiles: "The textile industry has as a whole been below normal for several years. It is reasonable to believe that it will show improvement next year and will be a better market for gears."

New Markets—Gearmakers are setting their sights on fast-developing markets in aviation, marine propulsion and automatic equipment. These industries demand continued technological advances in gears—higher speeds and closer tolerances. Trend toward automation also means more precision gearing for controls.

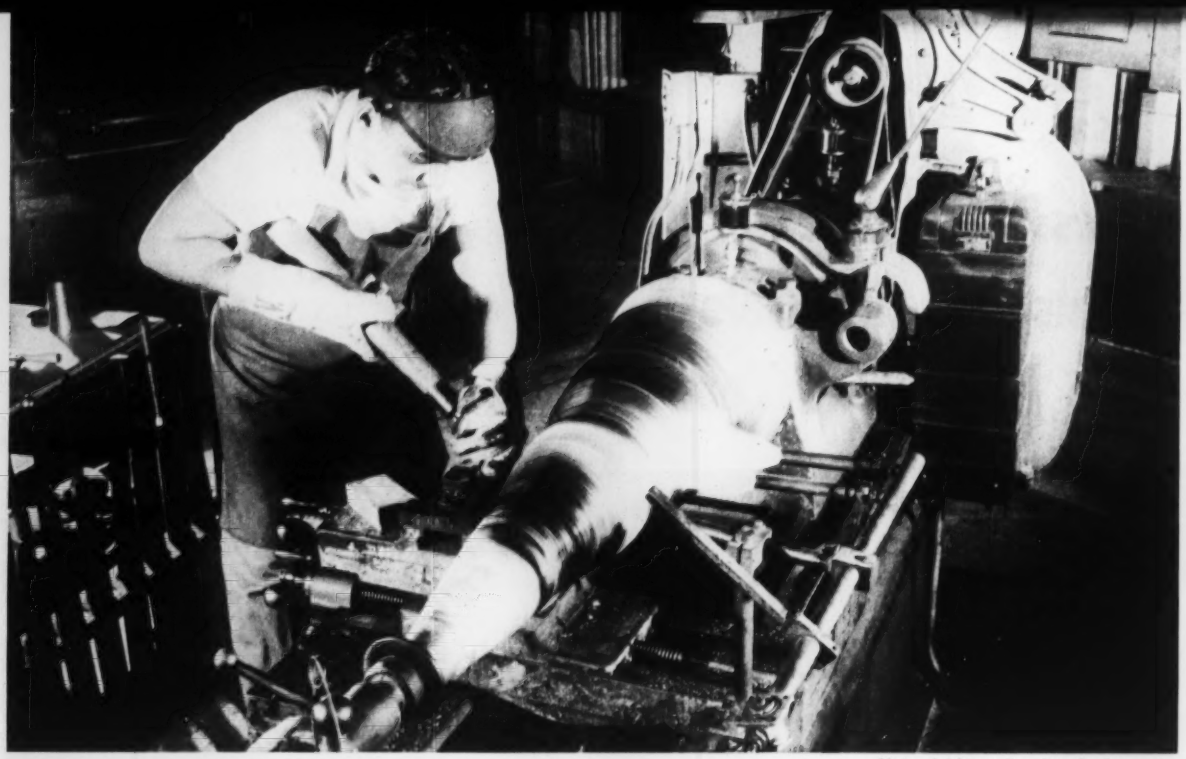
Leading consumers such as steel mills stress replacement requirements now. When new plant investment dropped off last year, so did orders for gears from mills. Now mill inventories are being depleted, and replacement demand is on the increase.

Minus and Plus—Orders from several other customers are slackening. Makers of large equipment often make their own gears when their sales drop. The mining industry's gear requirements are low. To balance this, sales are good to such diversified consumers as automakers, the chemical industry, petroleum, materials handling equipment producers and makers of construction equipment.

Early this year shipments exceeded new orders. Now demand has caught up with shipments and the gear backlog is holding level. Most gearmakers can supply any standard gear in two days to one week. Although most small shops are busier than they were in the previous three quarters, they continue to stress quick service.

Betting on Future—Confident that growing replacement demand will improve sales next year, many gearmakers are again investing in new equipment. Heavy competition caused a Cleveland firm to buy machinery to improve the finish on its product and a Pittsburgh company invested in equipment to widen the range of sizes it produces.

"In the past two months Pittsburgh mills doubled their inquiries about gear work," says a Pennsylvania gearmaker. "They will need more gears for maintenance next year. With industrial inventories lower than a year ago, gear sales have no place to go but up."



National Advisory Committee for Aeronautics

Aircraft research models are quickly formed by . . .

Metal Spinning: Old Art with a Future

METAL SPINNING, once largely an art, is fast becoming a production process in metal fabricating. While limited in application, it offers the most economical way to form many metal products.

The manual method of spinning is disappearing in large industry. Its future application, says C. M. Nelson, vice-president of Liquid Drive Corp., Holly, Mich., will be restricted to special uses. The semi-automatic method is taking over.

Sales Volume—Luke Gagnon, owner of the J. Schrader Co., Cleveland, estimates that custom spinning shops in the United States did a $75 million business in 1953. Estimates of 1954 sales range from $55 to $100 million. While spinners expect 1955 sales to be off about 20 per cent from this year's, they see no cause for concern.

Spinning's Forte—Spinning lends itself most economically to large or intricate shapes where die costs are excessive. In small quantity runs it really pays off. The time element is important; a chuck from which a spun part is produced can be made in a matter of days, not the months it often takes to produce dies.

Major industrial applications are in the jet aircraft manufacturing, appliance and utensils industries.

Another Use—Spun tubular sections have their broadest application in pressure containers. Large tank heads and gas cylinders are spun when the size and shape are the determining factors.

Almost any metal can be spun. Most common are aluminum, copper, brass, steel and stainless steel. Also spun, however, are Monel, Inconel, Mu-metal and titanium-base alloys.

First Cousin—A new method, akin to metal spinning, is the flow-forming of metal under hydraulic pressures. Pressure is applied to the workpiece through a rotating disc or roll. Recently adopted by the aircraft industry, flow-forming eliminates considerable machining and costs in material and requires less equipment, tools and processing than previous methods.

Future applications of metal spinning, says G. E. McCulloch, vice president and sales manager of Metal Spinners Inc., Milwaukee, lean heavily toward the semi-automatic method. Complete automation of a spinning line or machine would probably be prohibitive, from the cost angle, and would miss one of the method's best characteristics—the ability to be quickly set up for a variety of part shapes and sizes.

Crowded Field—There are more than 200 companies in the United States whose major capacity is devoted to metal spinning of all types of metal. Another 2000 do some.

One of the industry's critical problems is the shortage of trained and skilled operators. Even though the art has changed to a science, the experienced spinner is esential to the operation.

Nearly all shops have found it necessary to train their own spinners, and it takes from four to five years. As for now, there just aren't enough skilled men to go around.

Tempest Brews at Chrysler

Ambitious Emil Mazey wrings concessions from Chrysler. Stage set for CIO squabble

LABOR TROUBLES may not be over for Chrysler Corp. More important to the nation's third-largest automaker than the plant grievances to be settled is the start of what may become a game of pressure politics the UAW-CIO.

With only 50 minutes remaining until the strike deadline at its Auto Body Division, Chrisler granted Emil Mazey a full union shop for his ABD office workers, as well as status quo severance pay. Mr. Mazey refused to back down; the choice was concession on these two points or severe setbacks in the now-blooming new car market.

Potential Trouble—Chrysler action saved its production, but the implications of the settlement are still smoldering and could flare up again. The office workers at ABD now have rights not granted to the other 5100 office employees at Chrysler. More significant, in gaining these rights, Emil Mazey, head of the ABD department of the UAW-CIO, succeeded in bettering contracts negotiated by Norm Matthews who heads the Chrysler department of the union.

When Briggs was purchased by Chrysler, Mr. Mazey tenaciously held on to his control of the Briggs body department under its new auto body division status. He did not permit it to become a part of the Chrysler department as are other corporate division. Chrysler's argument that Briggs office workers should have contracts similar to those of other Chrysler office workers was met by a demand that contracts should include the above concessions.

Crux of the Matter—By properly timing his punches, Emil Mazey has gotten a better deal for his office workers than the 5100 other Chrysler office employees represented by Norm Matthews. The question now: What must Norm Matthews do to maintain his strength and what further moves will be made by Emil Mazey to build up his strength?

There is a strong implication that Chrysler may become a pawn in a game of union pressure politics just as it started to make some king-sized progress in regaining a bigger share of the automotive market.

AFL Hits Right-To-Work Laws

The American Federation of Labor has launched a nationwide campaign against the right-to-work laws enacted by 17 states. Other states are considering the same kind of legislation.

Alerting all state federations of labor, AFL President George Meany says that employer groups have organized well financed lobbies to press for the adoption of such laws, and the matter will be hot in 1955 when all but four state legislatures will be meeting. AFL has distributed to its state affiliates a new booklet entitled, "Right to Wreck," which charges that the right-to-work laws do not guarantee the right to work but merely prohibit all forms of union security contracts. The booklet charges that the states having such laws are far behind in industrial development those states where union security is permitted.

'Price Tags' Cut Costs

By "price-tagging" all production equipment (top) and tools (below), Clark Equipment Co.'s Industrial Truck Division found production workers had more respect for their equipment. Tool breakage expenses at its Battle Creek, Mich., plant have been reduced by 20 per cent and there has been substantially less machine downtime for maintenance and repair

Follansbee's Sale Blocked

Federal court upholds plea of minority stockholders. Management may appeal

ONLY THE FEDERAL COURTS can settle the fight for ownership of Follansbee Steel Corp.

Right now, though, it appears that the group headed by Cyrus Eaton, chairman of the board of the Chesapeake & Ohio Railway and Louis Berkman, Ohio steel man, is in the driver's seat.

Legalities—But before a decision can be reached, the legal hassle between 47 minority Follansbee stockholders and the Follansbee management must be settled. On Nov. 29, a federal court upheld the minority stockholders' petition to block management's sale of the company's physical assets to New York financier Frederick W. Richmond for $9 million or $21 per share. Grounds were that management failed to disclose all matters relating to the sale in its proxy statement, and that it was guilty of breach of fiduciary relations.

Before this order becomes effective, the minority stockholders must post a $1 million bond. If this is done and the decision stands, Mr. Eaton's offer to purchase the stock at the same price as that offered by Mr. Richmond should be accepted, since he has pledged that he will keep the facility in operation at Follansbee, W. Va., if he gains control. Present objections to the sale to Mr. Richmond arose because he proposed to close the plant.

Republic on Sidelines—Republic Steel Corp. had made him a $1.5 million offer for the mill's sheet rolling equipment, which it hopes to transfer to Gadsden, Ala., to diversify its pipemaking operations there.

But the fight is still not over. On Dec. 1, Mr. Richmond announced that he expected the court decision to be reversed (company management can go before the Federal Court of Appeals.) He asserted that he still wants to go through with the deal as originally planned, and that he will place $3.8 million in escrow to indicate his good faith.

By E. C. KREUTZBERG *Washington Editor*

More government-owned capital equipment will be sold, but . . .

U.S. Tries New Ways To Auction Tools

GOVERNMENT sales of capital equipment have always been a sore point to builders, but auctions coming up on Dec. 13 at Offutt base, Omaha, Nebr., and on Dec. 14 at O'Hare base, Park Ridge, Ill., promise to be different.

The auctions should prevent a repetition of the unplanned disposals after World War II.

They are the first sales of government-owned tools under the new controlled disposal program. Similar sales will be coming up at the six other Industrial Equipment Reserve storage sites of the Air Force, plus those of the Army and Navy.

Many Tools—The total number of tools to be cleaned out (they're of no further use to the military) is large—1325 at Offutt and 303 at O'Hare.

To avoid mistakes, a technique has been worked out under the so-called Honeywell-Drake agreement. It strives to protect the interests of the government without hurting machinery manufacturers through unwise and uncontrolled dumping.

The Case of Offutt . . .

How this works is illustrated by what happened in, say, the Offutt case. Items in excess of the Air Force's future requirements were screened by the Army and Navy and the General Services Administration. They were given the opportunity to take over surplus tools they needed. Then the remaining list was submitted to John H. Williams, chief, Office of Production Equipment, Department of Defense. Mr. Williams, invoking the Honeywell - Drake agreement, requested assistance of BDSA's Metalworking Equipment Division to determine which of the Offutt items should be retained in the National Industrial Equipment Reserve (NIER) and which should be offered for sale and under what conditions.

H. E. F. Hawkins is in charge of such matters in the BDSA Metalworking Equipment Division. He invited three interested industry associations — National Machine Tool Builders' Association, American Machine Tool Distributors Association and Machinery Dealers National Association—to furnish qualified men, four from each group. The 12 men assembled at the Offutt base under Mr. Hawkins, inspected the listed equipment and reported their findings to Mr. Hawkins who in turn reported to Mr. Williams with recommendations as to which tools to transfer to NIER and which to offer for sale.

End result was transference by Mr. Williams of some of the tools to NIER; tools in this group comprised general-purpose units in good operable condition and capable of use over a wide range. The others, including some general-purpose tools still fully useful but in excess of government needs, were listed for the auction sale of Dec. 13.

what's new?

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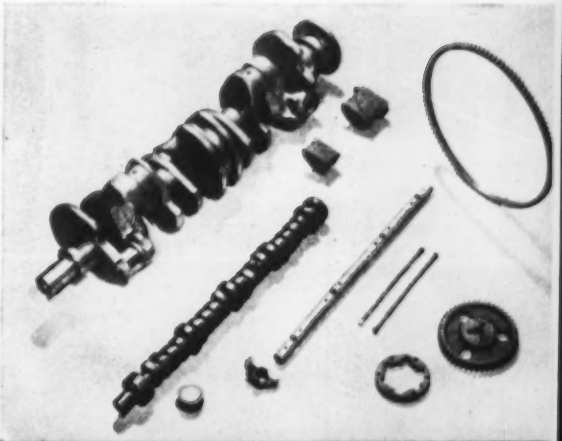
10/hr. to 70/hr.

It's no wonder the automotive industry turns to **flamatic** for selective heating precision. This machine, for example, provides the flexibility for development work on a variety of crankshafts or small lot production up to 10 parts/hour, simultaneously hardens main and pin bearing diameters in one operation. Interchangeable flame heads, adjustable flame head holders, and movable tailstock permit quick changes from one size to another . . . Another **flamatic** hardening machine for one size crankshaft hardens 70 parts/hour. Single- or multi-purpose **flamatic** machines have met production requirements on many automotive parts, a number of which are shown at the right. Write for new **flamatic** catalog, Publication No. M-1861.



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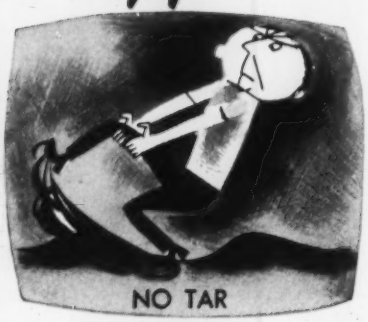

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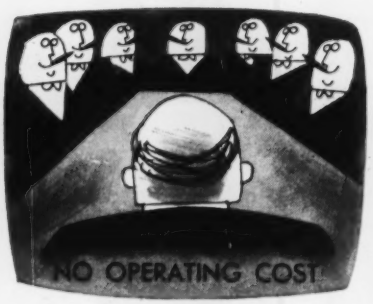

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How Clayton G. Jack Manages by Committee

LIKE HIS UNCLE, Clayton G. Jack doesn't have a college degree in engineering, yet he runs a firm whose business is complex engineering.

The uncle is the controversial Bill Jack who retired when he sold his interest in Jack & Heintz, Inc., but soon formed Bill Jack Scientific Instrument Co. to keep his hand in. Clayton is president and a director of the firm which has enjoyed steady growth since its founding in May, 1949. It now does an annual business of $5 million, employs 350 and has a net worth of over $1 million.

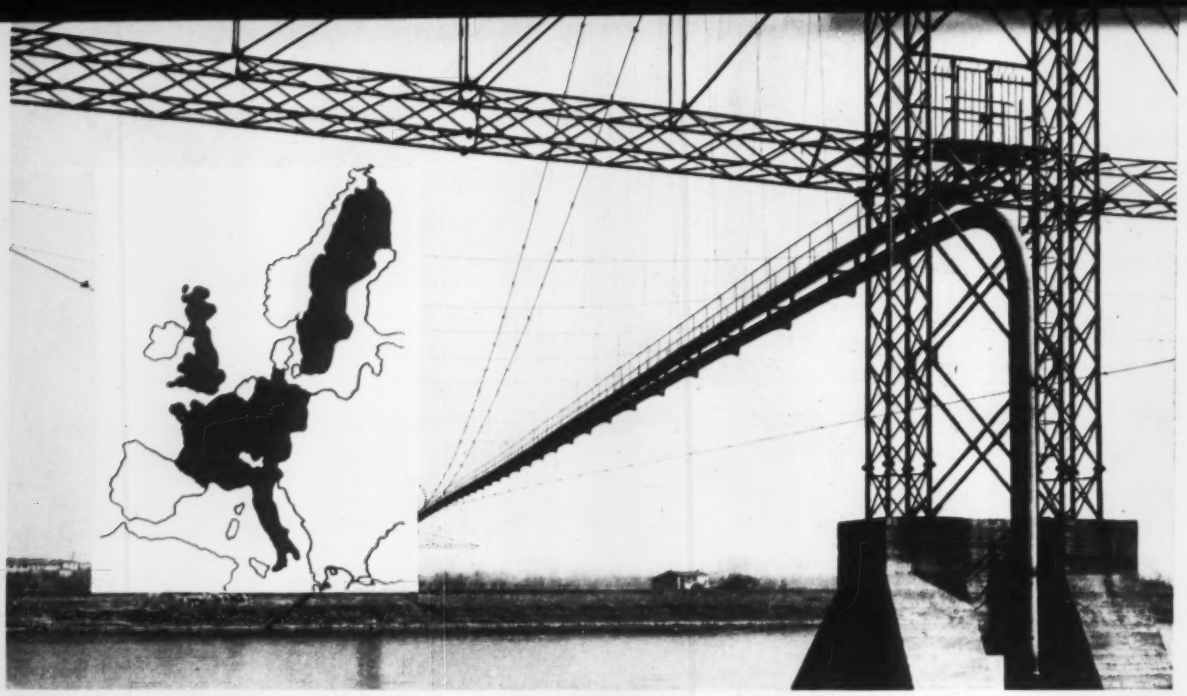
Background — BJSI's prime activity is the design and production of equipment for aerial photography. Nearly all its sales are to the military. "However, our current development includes several commercial items that should be available within a year — principally precision instruments," says the 36-year-old president. The company is also expanding and will soon have 65,000 sq ft of floor space, compared with the 8000 sq ft it had five years ago. In addition to camera control systems, BJSI makes about 15 types of cameras, actuator motors, Sound-Asorb helmets for jet pilots and other items.

The company board of directors, of which Bill Jack is chairman, sets the policies. Clayton Jack as president carries them out with the assistance of an advisory board whose members include such management men as the controller, the chief engineer and the production and sales managers. That committee, whose members' ages average only about 40, advises on contracts, what to bid, acceptance of contracts and similar matters.

Experience—Clayton Jack's major business background has been in purchasing, having been director of purchases for Jack & Heintz before joining the new company at Solana Beach, about 25 miles north of San Diego, Calif.

Some 80 employees of Jack & Heintz during World War II days are at Solana Beach. Although the widely publicized personnel practices of previous years are not followed to the same degree, the feeling that the associates are in partnership with management is maintained.

Comparison—"There are a number of obvious parallels with our operations of a decade ago," says Clayton Jack. "However, there are noticeable differences, too. J & H of World War II was essentially a mass producer, while BJSI began as an engineering and development firm." But during the last two years BJSI has concentrated on building its production capabilities around its growing line of scientific products. Without being a professional engineer, it's the job of Clayton Jack to keep BJSI in step with engineering developments and the production of its highly engineered products.



A methane gas duct spans the Ticino river in northern Italy

Revitalized Europe Gains Peaceful Prosperity

ITALY . . .

Most economic indicators were up in 1954. Traditional high costs resume prewar significance

ITALY ENJOYED a good measure of prosperity in 1954; the question is whether it will be strong enough to survive in '55.

Gross national product in Italy was 4 to 5 per cent above the level of 1953 in 1954; after a dip in the second quarter, industrial production rebounded and should end up about 10 per cent higher this year than last.

Above Average—Activity of the mining, chemical, oil and coal refining, electric power, rubber and metal producing industries was above the national average. The boom in oil and gas drilling is far from over. New methane gas fields have been discovered, and the pipeline network for feeding the gas to industrial centers continues to spread. New oil fields have been established in Sicily.

Italian exports on the whole rose 10 per cent in 1954 over 1953. Finally, but far from least, Italian steel output will probably set an all-time record this year at about 4.9 million net tons. Pig iron production will come close to 1.6 million net tons.

Still Growing—Apparent per capita consumption of steel in Italy is expected to set a new peak of over 220 lb, up 10 per cent, in 1954. At the present rate of increase, Italian home steel consumption will reach above 7 million net tons within 5 years.

Why, with such promising activity and growth, is there a question about Italy's ability to maintain and enlarge its present level of prosperity in 1955? Basically, the problem is whether Italy can remain competitive pricewise.

In Proportion—The situation for the Italian steelmaking industry, for example, is not so bright as the statistics above may suggest. While output of domestic steel has increased, demand has gained even more. So imports of semifinished and finished steel products have risen at least 10 per cent in 1954, supplying more than 20 per cent of Italian steel requirements. In fact, Italian steelworks have worked on the average at less than 60 per cent of their capacity in 1954, a level too low to be economically healthy in the long run.

And, say the Italians, when the temporary tariff protection allowed Italy under the European Coal & Steel Community expires, its steel industry will be facing even greater competition from the European steelmaking giants, West Germany and France.

Inescapable—High-priced steel coupled with high labor costs result in high-priced Italian metalworking goods. While the general industrial production rate was 10 per cent higher in 1954 than in 1953, the metalworking industry did not do so well; the construction industry even fell below the level of 1953. Industrial machinery, electrical equipment and instrument output are below the average gain.

Though Italian exports have in-

creased somewhat, imports have risen apace. That, together with a gradual decrease in aids and loans leaves a persistent imbalance of trade. The import excess over exports was running at an annual rate of $913 million for first half, 1954, compared with $907 million for 1953.

The Answers?—So Italian metalworking again next year will be seeking answers to its cost problems. For the steel industry, these are the objectives: A guaranty from ECSC of regular supplies of iron ore and scrap at equitable prices; equalization of the tax burden with other countries within ECSC; availability of investment capital at reasonable rates; unrestricted movement of labor within ECSC; and strong anti-dumping policies particularly with regard to steel.

Much of the outlook for the Italian steel industry—and the Italian metalworking industry — depends on how fully the ECSC meets those demands. Right now it appears that Italy will be only moderately successful.

SWEDEN . . .

Over-all, a good year in 1954. Steel and metalworking output were strong points

METALWORKING management in Sweden plans on continued high-level activity in 1955.

Here's how the situation looks today: From 1953 to date, private consumption is up about 3 per cent and the volume of imports and exports is roughly 10 per cent larger. Steel production this year is expected to rise 5 per cent over last year's, and a turn down is not in sight.

Most Encouraging—One of the most encouraging aspects of the relative prosperity in Sweden is that it's based mostly on a peacetime economy.

Of the increase in private consumption, for example, nearly 50 per cent is due to the higher levels of buying and maintenance of automobiles. Sweden truly is becoming motor-minded. Registrations of cars should exceed 100,000 this year, up about 50 per cent from 1953. Most of the new cars are imported, mainly from Germany and England. About 20,000 cars will be produced in Sweden this year.

Ready and Able—The Swedish steel industry is ready and able to take care of the increased metalworking activity. Its steel output, made possible by an expansion program that started in 1947, will be about 2 million net tons this year. That will be about 50 per cent more than 1947's.

Most of the increased capacity is for low-grade steel for domestic consumption. High-quality Swedish steel is produced and exported at about the same rate as prewar. Until recently, however, most high-quality Swedish steel was made from charcoal pig iron. As late as 1949, charcoal pig iron production accounted for more than 30 per cent of the total. Since then a cheaper coke pig iron has been developed, though, and the percentage of steel made from charcoal pig iron has declined to less than 5 per cent in 1954.

Fully Bounced-Back — Swedish metalworking showed it completely recovered from its 1952-53 depression by expanding its investment in capital improvements 15 per cent from 1953 to 1954. Exports of machinery, in turn, rose 20 per cent in the same period.

Shipbuilding yards are working at full capacity. Their worst problem: A shortage of labor.

Buildings Going Up—The construction industry is also expanding. Residential building increased 5 to 10 per cent and industrial building 7 per cent in 1954 over 1953. The number of applications for building permits is still increasing, so the high building activity will continue for months.

Short of a world-wide reversal of present business conditions, Sweden's metalworking management generally looks for a continuation of 1954 through most of 1955.

THESE articles begin a series on the economic presents and futures of the major European countries. Next week we will deal with Belgium and France.

Swedish steel industry completes expansion

To our Favorite Boss!

From the receptionist at the front door through to the last man on the loading platform—*all* of us here at Great Lakes Steel have a very important *something* in common. It is the knowledge that your continued and expanded need for our products determines the future and growth of every one of us, regardless of our individual jobs here.

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That's why we at Great Lakes are seeing to it that our steel is the kind you have a right to expect from a specialist in flat-rolled products. We know the importance of prompt shipments, top quality, proper packaging and loading, dependable information, and clerical accuracy. We think you'll agree that our many satisfied customers are a pretty good indication that this policy is good business for all concerned.

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By FLOYD G. LAWRENCE *Detroit Editor*

Auto Horsepower Ratings: They're as Advertised, but . . .

REAR WHEELS ARE WHERE HORSEPOWER COUNTS

To drive at . . .	You need* . . .
20 mph	3 horsepower
40 mph	11 horsepower
50 mph	18 horsepower
60 mph	24 horsepower
80 mph	46 horsepower
100 mph	84 horsepower

*For an average car traveling on a level road with no wind.

AT A NEW MODEL preview, a chief engineer was advised by his sales manager that an engine had three more horsepower than he thought. The occurrence was the more remarkable since the chief engineer had before him a power curve drawn from dynamometer data on the engine.

Silence Preferred—Most companies avoid such situations by refusing to talk about horsepower until advertising copy, the point of no return in the horsepower race, is irrevocably committed by their competitors. Such goings-on might lead sophisticated observers to deduce that horsepower figures lie in the realm of science fiction and are derived by the formula, competition plus a superiority factor.

As mean horsepower moves over 200, based on the highest output for each make compared with only 160 last year and 133 in 1952, it might prove interesting to take a look with a "sez who" attitude. The answer: Advertised horsepower is and is not what it seems to be.

Hypothesis—Let's take a hypothetical car advertising 260 hp, which nobody is at the moment. To arrive at this figure, the engine is placed on a dynamometer. It probably is an engine built at loose fit tolerances since it is only developmental at this time, giving perhaps five more horsepower than tighter engines.

Next, the air cleaner is removed which, with the modern silencer types, adds up to 7 hp. The water pump is removed, giving 5 hp. The generator runs at zero charge giving another 1 hp or so. The standard mufflers and tailpipes are replaced with a laboratory exhaust system, giving up to 25 hp. The intake manifold hot spot is disconnected, and, in some cases, shims are used to blank off the exhaust crossover passage in the intake manifold, giving about 7 hp.

Special—During the running of the engine, the automatic spark advance is disconnected and spark is advanced manually for optimum setting. The carburetor is also manually adjusted at optimum output. The oil is the thinnest useable and manifolds undoubtedly fit the head orifices well, adding a few more horsepower the average owner might not expect.

In addition to the above, the engine when placed in a car is pulling a fan, power accessories and is placed in a compartment designed by stylists to keep the engine from breathing. Normal under-hood temperatures are about 120 degrees F contrasted with the 60 degrees F to which horsepower ratings are corrected. Temperature alone means about 15 hp lost from our hypothetical engine.

Big Loss—All things considered, including drive train losses, the advertised horsepower is off as much as 40 per cent from the horsepower the owner can expect at the rear wheels where the propelling work takes place; that means about 156 hp instead of 260 hp.

Before you conclude that the automakers should be hoisted on their own petards, note that the 156 hp at the rear wheels is real stuff which contains both the torque and speed of which horsepower is composed. And with most companies rating their engines today in similar fashion, the net effects are relatively standard and provide a handy tool for basic engine comparison so long as you don't split horsepower.

GM Gives a Push—This move toward standardization may have been given an additional push this year by the published "General Motors Automotive Engine Test

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732	713,778
July	543,534	756,592
August	523,799	640,186
September	364,441	605,228
October	311,968†	651,153
November	613,000*	457,852
December		529,588
Total		7,815,877

Week Ended	1954	1953
Oct. 30	90,662	145,311
Nov. 6	116,179	133,783
Nov. 13	141,154	115,748
Nov. 20	160,097	108,729
Nov. 27	133,493†	74,290
Dec. 4	156,000*	123,148

Source: Ward's Automotive Reports. †Preliminary. *Estimated by STEEL.

Code." Available to any schoolboy with a dynamometer, duplication of the horsepower advertised within production tolerances is claimed possible by following outlined steps.

But should a standard procedure be agreed upon, it would shake the industry more than the asphalt. For engine men are the first to point out that the significant criteria of engine performance to them—and to the next traffic light jockey—are acceleration and top speed figures, coupled with fuel economy. As shown in the table, plenty of horsepower is held in reserve for the average car at most driving speeds on a level road with no wind.

Matter of Torque—Remember, however, that horsepower is directly related to speed as a measure of work being done, but only indirectly related to acceleration, which is largely contingent on the turning force available or torque. Further, the torque is used to accelerate a mass, and the weight of the vehicle is critical in a happy outcome.

Two trends may be cited tending to lower acceleration performance: The trend of even "light" cars to put on weight, adding up to 300 to 500 lb in some cases, and the use of lower rear axle ratios for better fuel economy. Also interesting is a trend to rate modern engines at 4400-4600 rpm, contrasted with the 3600-3800 rpm of their predecessors, to up horsepower.

The Hp Job—But horsepower has been doing a job along with the torque and speed which comprise it. In 1933 the average car had 73 hp and would do 0-60 mph in about 25 seconds, with a top speed of 68 mph. In 1955 the average car should have about 200 hp, do 0-60 in about 12 seconds and have a top speed of about 105 mph. And economy should be over 20 miles per gallon, compared with about 12 miles per gallon in 1933.

So regardless of the discrepancy between advertised horsepower and the horsepower at the rear wheels, glory in the brilliance of that incredible V-8.

1955 4-DOOR SEDANS—WHAT YOU GET FOR YOUR MONEY

MAKE	SPECIFICATIONS							COST OF OPTIONAL EQUIPMENT					
	Price[1]	Wheel-base	Length	Weight	Max. hp at rpm	Compr. Ratio	Engine Type	Over-drive	Auto. Trans.	Power Steer.	Power Brakes	Radio	Heater
CHEVROLET													
150 series	$1728	115	195.6	3220‡	136/4200‡	7.5:1	OHV-6*	$100.00	$165.00	$85.00	$35.00	$62.00	$45.00
210 series	1918	115	195.6	3190	162/4400**	8.0:1	V-8*	100.00	165.00	85.00	35.00	62.00	45.00
Bel Air	2031	115	195.6	3190	162/4400**	8.0:1	V-8*	100.00	165.00	85.00	35.00	62.00	45.00
PONTIAC													
Chieftain 860	2164	122	203.2	NA	180/4600	8.0:1	V-8	NO	165.00	100.00	33.00	75.00	79.75
Chieftain 870	2268	122	203.2	NA	180/4600	8.0:1	V-8	NO	165.00	100.00	33.00	75.00	79.75
Star Chief	2362	124	210.2	NA	180/4600	8.0:1	V-8	NO	165.00	100.00	33.00	75.00	79.75
Star Chief Custom	2455	124	210.2	NA	180/4600	8.0:1	V-8	NO	165.00	100.00	33.00	75.00	79.75
OLDSMOBILE													
88 series	2362	122	203.36	3710	185/4000	8.5:1	V-8	NO	165.00	100.00	37.00	94.50	74.50
Super 88 series	2503	122	203.36	3765	202/4000	8.5:1	V-8	NO	165.00	100.00	37.00	94.50	74.50
98 series	2833	126	212.36	3870	202/4000	8.5:1	V-8	NO	165.00	100.00	37.00	94.50	74.50
BUICK													
Special	2291	122	206.7	3742	188/4800	9.0:1	V-8	NO	178.00	100.00	36.00§§	86.00	76.00
Century	2548	122	206.7	3807	236/4600	9.0:1	V-8	NO	178.00	100.00	36.00§§	86.00	76.00
Super	2876	127	216.0	4141	236/4600	9.0:1	V-8	NO	178.00	standard	36.00§§	86.00	76.00
Roadmaster	3349	127	216.0	4278	236/4600	9.0:1	V-8	NO	standard	standard	36.00§§	86.00	76.00
CADILLAC													
Series 62	3976	129	216.3	4370	250/4600	9.0:1	V-8	NO	standard	standard	47.70	131.95	128.85
Fleetwood 60	4728	133	227.3	4540	250/4600	9.0:1	V-8	NO	standard	standard	47.70	131.95	128.85
Fleetwood 75	6186	149.8	237.1	5015	250/4600	9.0:1	V-8	NO	standard	standard	47.70	214.00	179.00
PLYMOUTH													
Plaza series	1755	115	203.8	NA	117/3600	7.4:1	LH-6†	100.00	165.00	90.00	35.00	83.50	45.00††
Savoy series	1958	115	203.8	NA	157/4400	7.6:1	V-8†	100.00	165.00	90.00	35.00	83.50	45.00††
Belvedere series	2057	115	203.8	NA	167/4400	7.6:1	V-8†	100.00	165.00	90.00	35.00	83.50	45.00††
DODGE													
Coronet 6	2068	120	212.1	NA	123/3600	7.4:1	LH-6	100.00	165.00	105.00	35.00	71.30	72.65
Royal V-8	2285	120	212.1	NA	175/4400	7.6:1	V-8	100.00	165.00	105.00	35.00	71.30	72.65
Custom Royal V-8	2448	120	212.1	NA	183/4400	7.6:1	V-8	100.00	165.00	105.00	35.00	71.30	72.65
DESOTO													
Firedome	2268	126	217.9	3890‡	185/4400	7.5:1	V-8	100.00	175.00	105.00	37.00	92.80	76.20
Fireflite	2481	126	217.9	3960‡	200/4400	7.5:1	V-8	100.00	175.00	105.00	37.00	92.80	76.20
CHRYSLER													
Windsor Deluxe	2412	126	218.6	NA	188/4400	8.0:1	V-8	NO	175.00	105.00	37.00	115.40	76.20
New Yorker Deluxe	3185	126	218.8	NA	250/4600	8.5:1	V-8	NO	standard	105.00	standard	115.40	76.20
Imperial	4105	130	223.0	NA	250/4600	8.5:1	V-8	NO	standard	standard	standard	115.40	76.20
FORD													
Mainline	1753	115.5	198	3106	120/4000	7.5:1	OHV-6‡	102.00	165.00	85.00	32.00	81.30	66.43
Customline	1945	115.5	198	3236	162/4400	7.6:1‡‡	V-8‡	102.00	165.00	85.00	32.00	81.30	66.43
Fairlane	2097	115.5	198	3268	162/4400	7.6:1‡‡	V-8‡	102.00	165.00	85.00	32.00	81.30	66.43
MERCURY													
Custom	2070***	119	206.3	NA	188/4400	7.6:1	V-8	NA	NA	NA	NA	NA	NA
Monterey	2185***	119	206.3	NA	188/4400	7.6:1	V-8	NA	NA	NA	NA	NA	NA
LINCOLN													
Lincoln	3563	123	215.6	NA	225/4400	8.5:1	V-8	NO	standard	129.00	43.00	130.80	121.00
Capri	3752	123	215.6	NA	225/4400	8.5:1	V-8	NO	standard	129.00	43.00	130.80	121.00
NASH													
Rambler Deluxe	1695	108	186¼	2630	90/3800	7.3:1	LH-6	103.50	178.85	NO	NO	76.00	74.00
Rambler Super	1798	108	186¼	2630	90/3800	7.3:1	LH-6	103.50	178.85	NO	NO	76.00	74.00
Rambler Custom	1989	108	186¼	2630	90/3800	7.3:1	LH-6	103.50	178.85	NO	NO	76.00	74.00

* V-8 optional at $99. † V-8 optional at $96. ‡ V-8 optional at $99.98. § With automatic transmission. ** 180 hp at 4600 rpm with four-barrel carburetor and dual exhaust. †† $70 with defroster motor. ‡‡ With power package—8.5:1, 182 hp at 4400 rpm. §§ Only on Dynaflow-equipped cars. NA — price not available. NO — not offered. [1]These are factory retail prices including federal excise tax, handling and distribution charges but exclusive of state and local taxes and transportation charges. ***Federal excise tax and handling charges not included

Shooting Completed – **NEW DIE CASTING FILM NOW READY!**

Get the Facts on ZINC Die Casting ECONOMIES

When you see the new motion picture "DIE CASTING—How Else Would You Make It?" (just released by the American Zinc Institute, Inc.) you will learn the basic reasons why ZINC Die Castings are so low in cost. You will find, for example, that their economy begins with the kind of machine on which they are produced.

The above scene from the new film shows a battery of high speed ZINC die casting machines. *Only* ZINC, among the principal die casting metals, can be cast in these machines. And this maximum production speed means minimum die casting costs to you.

But the 35-minute motion picture is not confined to the actual casting procedure. It also covers part design, die design, secondary operations, finishing and applications. It not only will help you to bring ZINC into proper focus among die casting metals but it establishes the relationship of die casting to other high speed production methods.

HOW TO SEE THE NEW FILM—

If you have access to projection equipment (the film is 16 mm. Kodachrome with sound) and can arrange to get a group together to see the picture, a print can be borrowed free-of-charge from the American Zinc Institute, Inc., 60 East 42nd Street, New York 17, New York. When writing, try to give several alternate dates for the showing and advise the size of the audience (you will also receive copies of a new 24-page booklet on die castings for those viewing the film).

The New Jersey Zinc Company
160 Front St., New York 38, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

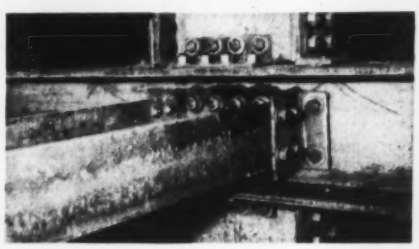
All field connections in new Equitable skyscraper are made with RB&W high-strength bolts!

First San Francisco skyscraper to go up since adoption of the city's strict 1948 earthquake code, the new 25-story Equitable Life Assurance Society building features a unique design of tapered steel columns and butterfly-shaped spandrel beams in outside walls.

A landmark in architectural design, the structure also makes news on another count—all field connections are made with RB&W high-tensile-strength bolts.

This proven fastening technique provides greater strength (important in dealing with earthquakes!) at less actual cost. And the faster installation it permits often slices erection time by weeks!

An important installation like this underlines the fast-growing acceptance of high-strength bolting for tough jobs that place a premium on speed and strength. Find out why RB&W is in the lead in this technique by writing for our catalog, "High-Strength Bolts for Structural Steel Connections." 4-32A



CLOSE-UP of RB&W high-strength bolts in Equitable's new skyscraper. Architects: Loubet & Glynn Associates and W. D. Peugh; Irwin Clavan, consulting. Gen'l contractor: Dinwiddie Construction Co., San Francisco. Steel erector Consolidated Western Steel Div., U. S. Steel Corp.

See our insert on high-strength bolts in Sweet's Architectural File

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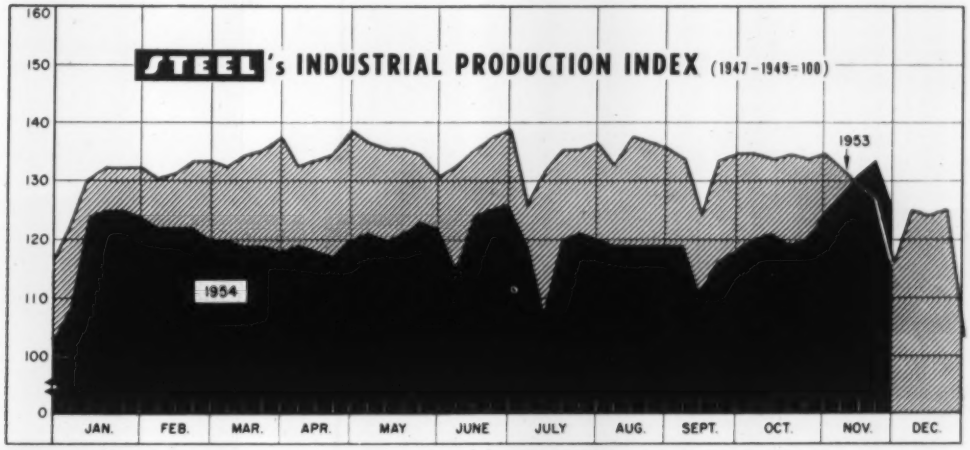

*Week ended Nov. 27.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

New Orders, Steady Prices Signal Higher Production

DECEMBER should be a good month for business. The auto industry is entering it at a high level. Steel is over the hump of 80 per cent of capacity. Other manufacturing industries are making good gains over summer lows. Retailers are already getting a pre-Christmas surge. There are predictions that the slump in production that comes during the year-end holidays will be smaller than usual this year.

The latest survey of the National Association of Purchasing Agents reinforces forecasts of continuing industrial gains. Continuation of the present slow but steady improvement is looked for. And that steady gain will be more important than brief spurts over the long run.

Foundations—Strengthening the good outlook: New orders have outdistanced production by a small but encouraging margin; prices are leveling out with strength and stability; inventory liquidation is even closer to completion; employment is up or at least holding on to previous advances. Buying policy, though, is still in the hand-to-mouth stage up to 90 days, with most buyers in the middle of the bracket.

Capital expenditures will still be substantial in 1955. Forty per cent of the PAs expect to spend more than they did in 1954. Another 25 per cent plan to spend about the same; 30 per cent think their outlays will be lower. For individual companies, forecasts range from moderate changes to extremely high and low capital budgets.

Looking Ahead — Prices are steadier than they have been for the last 3 months. Advances are few and small. The lowest number of PAs since August report higher prices for important industrial materials purchased. Keen competition up and down the line is a big factor. Most buyers feel present prices will hold on through

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,919	1,915	1,972
Electric Power Distributed (million kwhr)	9,080[1]	9,317	8,138
Bitum. Coal Output (daily av.—1000 tons)	1,485	1,453	1,475
Petroleum Production (daily av.—1000 bbl)	6,154[1]	6,264	6,227
Construction Volume (ENR—millions)	$254.2	$301.8	$244.7
Automobile, Truck Output (Ward's—units)	133,493	160,097	74,270
TRADE			
Freight Car Loadings (unit—1000 cars)	575[1]	697	596
Business Failures (Dun & Bradstreet, no.)	195[1]	208	173
Currency in Circulation (millions)[3]	$30,412	$30,233	$30,691
Dept. Store Sales (changes from year ago)[3]	+2%	2%	—2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,029	$18,182	$18,636
Federal Gross Debt (billions)	$278.8	$278.7	$275.1
Bond Volume, NYSE (millions)	$23.5	$22.8	$11.5
Stocks Sales, NYSE (thousands of shares)	13,688	16,791	6,028
Loans and Investments (billions)[4]	$85.7	$84.4	$80.5
U. S. Gov't. Obligations Held (billions)[4]	$37.7	$37.4	$32.6
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.38
STEEL's Nonferrous Metal Price Index[6]	217.8	218.3	206.7
All Commodities[7]	109.5[1]	109.5	110.0
Commodities Other Than Farm & Foods[7]	114.5[1]	114.5	114.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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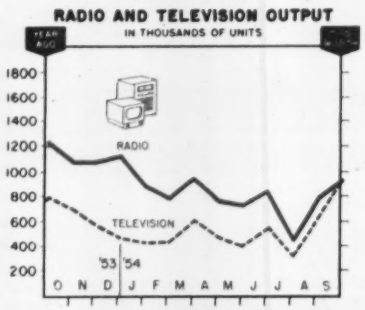
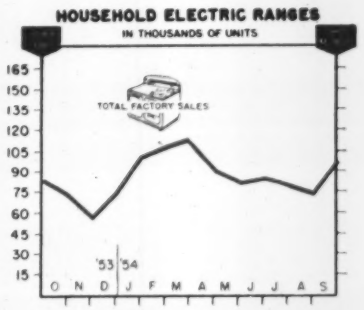
THE BUSINESS TREND





Thousands of Units

	Radio		Television	
	1954	1953	1954	1953
Jan.	872	1,093	421	719
Feb.	769	1,192	427	731
Mar.	940	1,549	600	810
Apr.	745	1,159	458	568
May	722	1,109	396	482
June	838	1,164	544	524
July	438	674	307	316
Aug.	785	992	633	604
Sept.	932	1,217	948	770
Oct.	...	1,052	...	680
Nov.	...	1,066	...	580
Dec.	...	1,101	...	450
Total	...	13,368	...	7,214

Radio-Electronics-Television Mfrs. Assn.

Charts Copyright 1954 STEEL.

Total Factory Sales—Units

	1954	1953	1952
Jan.	101,870	88,145	79,982
Feb.	109,647	114,465	63,063
Mar.	115,393	130,788	93,225
Apr.	96,751	118,999	69,149
May	82,649	114,404	68,117
June	85,854	113,086	86,817
July	80,017	77,836	33,465
Aug.	75,907	74,326	74,853
Sept.	99,611	84,481	62,404
Oct.	...	73,422	63,143
Nov.	...	65,748	72,982
Dec.	...	73,870	84,630
Total	1,119,570		901,860

National Electrical Mfrs. Assn.

the end of the year at least.

About one-fifth of the PAs report moderate stock additions. That's the highest figure of the year. A little over a quarter, the lowest number of the year, report further liquidation of inventories. Easy availability of supplies is encouraging present inventory policies. Generally, stocks are well balanced and at satisfactory operating levels.

Reinforcements — One reason why some firms have not upped ordering is that year-end inventory taking is coming. Some others are holding back for tax reasons. Those two factors indicate good things to come in the first quarter of 1955. That holding back of buying is also an indication of the belief that the existing price structure will hold up for a while.

Exceptions to the easy-to-get rule, according to the PAs, are: Copper, mercury, selenium and galvanized steel sheets—most of which have been in that category for some time.

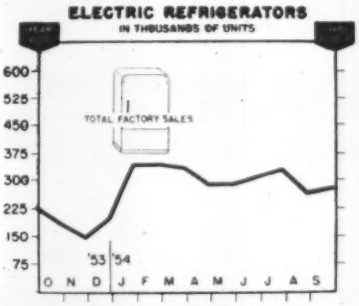
Employment Steadies . . .

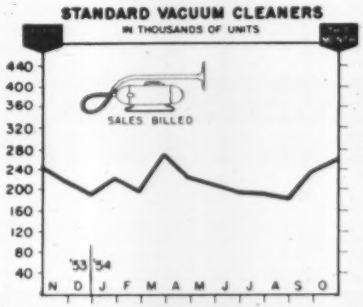
November additions to payrolls are slightly less than the average of the last 2 months. On the other hand, reductions are the lowest reported in a year and a half. Most respondents are holding on to previously reported higher employment. There is still little overtime, except in the auto industry. But there is additional movement toward a full 40-hour week. Fewer strikes are noted.

Canadian members of the association report that production is up. New orders have gained considerably from last month, and inventories are growing. Prices are in line with those in the U. S. Employment is leveling off. Buying policy is still close but a little longer range than in the U. S. Plans are for high capital spending ahead, and the agents are optimistic for a continuation of generally good industrial business in Canada.

Metalworking Adds Push . . .

That report of the PAs on employment parallels one from the Labor department. Metalworking is a strong contributor to the brightening picture, with the auto industry the standout performer. Adding strength are steel, metal products and electrical machinery. Substantial additions by trade and services to handle the holi-





Total Factory Sales—Units

	1954	1953	1952
Jan.	344,101	325,186	260,259
Feb.	334,122	277,605	259,838
Mar.	330,641	368,498	276,972
Apr.	280,900	366,951	225,994
May	282,164	317,667	217,017
June	303,127	343,114	324,885
July	325,061	298,838	333,877
Aug.	256,665	232,981	250,224
Sept.	271,859	231,224	230,111
Oct.		179,749	207,065
Nov.		139,563	256,530
Dec.		197,102	248,506
Total		3,378,478	3,091,434

National Electric Mfrs. Assn.

Sales Billed—Units

	1954	1953	1952
Jan.	221,233	255,886	223,357
Feb.	199,035	246,007	230,226
Mar.	276,464	329,294	290,092
Apr.	220,849	268,548	217,169
May	209,434	252,404	216,969
June	195,781	197,506	206,939
July	193,607	159,446	188,715
Aug.	185,397	188,536	222,413
Sept.	238,285	227,253	237,541
Oct.		249,383	292,474
Nov.		216,227	254,297
Dec.		190,773	249,032
Total		2,781,263	2,841,803

Vacuum Cleaner Mfrs. Assn.

day trade made the pickup more than seasonal.

Four major employment areas moved up a notch in the department's ratings. Columbus, Ga., Peoria, Ill., and San Antonio, Tex., went from the substantial labor surplus group to moderate labor surplus. The Hamilton-Middletown, O., area took a step the other way, from a balanced supply to a moderate labor surplus.

Back on the brighter side, about two-thirds of the areas covered reported a decline in insured unemployment among workers covered by state unemployment insurance. In 21 areas, including Detroit, Cincinnati and Providence, R. I., the insured unemployment decline amounted to 20 per cent or more.

More Gains Ahead . . .

Looking ahead, employer hiring plans indicate further slight gains through year end. Increases in factory employment will reinforce the pre-Christmas gains in nonmanufacturing activities. About one-third of the 149 major areas expect to have higher job levels by Jan. 15. All of which means more money in the hands of consumers. And according to present indications, the consumer won't be reluctant to part with that cash.

Going along with the outlook for high consumer spending is another Labor department report that the average weekly take-home pay of American factory workers was at a record level for October. In addition, the purchasing power of that paycheck was also up.

Increased hourly earnings offset the effect of shorter work weeks. Coupled with the lower income tax rates in effect since early this year and a slight decline in consumer prices, the average worker was better off cashwise than ever before, except for a short period during World War II.

Trends Fore and Aft . . .

Billings of members of the Metal Treating Institute rose 3 per cent from September to October . . . Volume in the gearing industry gained 12.7 per cent in the same period, according to American Gear Manufacturers Association . . . Highest car output in 53 months has been scheduled for December, says *Ward's Automotive Reports* . . . Truck output is strong, but like in autos, the independents are getting a smaller share.

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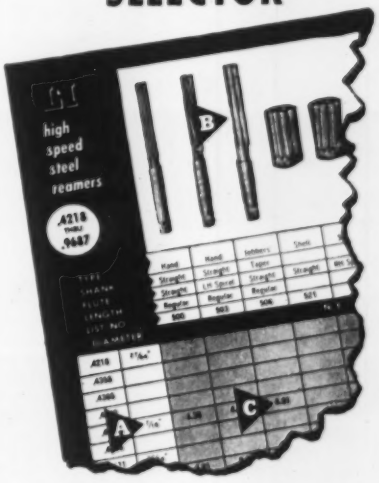

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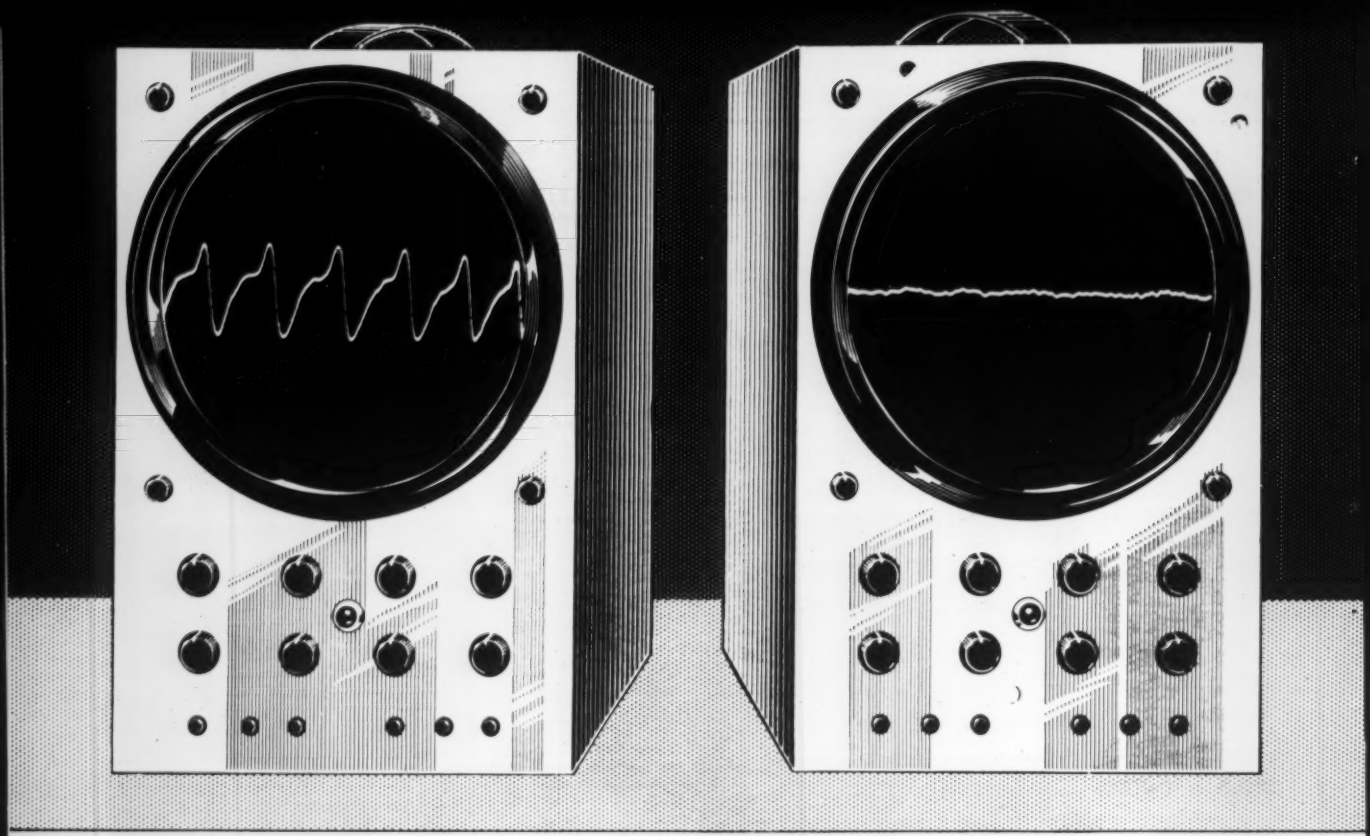

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How effectively Sunoco Way Lubricant stops slip-stick table motion is graphically illustrated by these oscillograms. The pattern on the left was made with a straight mineral oil as the lubricant; the other was made with Sunoco Way Lubricant on the ways. Both patterns are magnifications of changes in rate of table travel and were obtained under identical conditions.

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. . . Cadillac manager of purchases

THEODORE O. HELBERG
. . . Lovell Mfg. gen. supt.

OTTO M. KONRATH
. . . v. p. at Lyon Metal Products

J. H. Lamb, former operations manager, Cleveland tank plant, was made manager of purchases for **Cadillac Motor Car Division,** General Motors Corp., at Detroit. Mr. Lamb succeeds **R. A. Vogel,** who was appointed GM's executive in charge of procurement and schedules.

John E. Haig, vice president and secretary, was elected president of **Ajax Electric Co.,** Philadelphia. He succeeds the late **William Adam Jr. Leon B. Rosseau** was re-elected vice president and **E. A. Ginkinger,** former treasurer, was elected secretary-treasurer.

James N. Huber, purchasing agent, Keystone Fabricating Co., was made purchasing agent of **Fort Duquesne Steel Co.,** Pittsburgh, a division of Federated Steel Corp.

Burns Hawkins was appointed vice president, **Ziv Steel & Wire Co.,** Chicago.

Anaconda Wire & Cable Co., New York, appointed **H. V. Van Valkenburg** sales manager. Formerly district manager at Chicago, he is replaced by **Ernest B. Miller Jr. C. B. Peck Jr.** was made manager of industrial sales; **J. L. Tindale,** manager of utility sales; and **H. E. West,** manager of contractor sales. **John N. Ratcliff Jr.** was made Houston district sales manager.

Theodore O. Helberg was made general superintendent, **Lovell Mfg. Co.,** Erie, Pa. He succeeds **Earl V. Godfrey,** who remains with the company in an advisory capacity.

Paul I. Birchard was appointed vice president and general manager of Westinghouse Air Brake Co.'s **Le Roi Division,** Milwaukee. He replaces **Edward J. Green,** who has been temporary general manager of the division since the resignation of **T. O. Liebscher,** former Le Roi president. For the last six years, Mr. Birchard has been vice president-general manager of Enterprise Engine & Machine Co., San Francisco.

Thomas R. Allen, former president of Continental Iron & Steel Co., is now associated with the New York office of **Luria Brothers & Co. Inc. Hy Burstein** joins Luria as a buyer in scrap iron and steel.

Fabriform Metal Products, Los Angeles, recently purchased by George Getz Corp., Chicago, appointed **Kenneth L. Glick** general manager. **A. M. Thompson** remains as sales and advertising manager.

Joseph W. Seaman was made general manager of **General Electric Co.'s** power transformer department at Pittsfield, Mass.

Otto M. Konrath was elected vice president in charge of production, **Lyon Metal Products Inc.,** Aurora, Ill. He formerly was production manager of Lyon's two manufacturing plants. **Neal Ormond,** formerly director of personnel relations, was elected vice president-personnel relations.

D. D. Robertson and **J. R. Miller** were made vice presidents of **Dana Corp.,** Toledo, O. Mr. Robertson was director of sales, and Mr. Miller was director of manufacturing. Both continue to head those activities.

J. Gordon Barker was elected president, **Vanadium-Alloys Steel Canada Ltd. J. P. Gill,** president of the parent company, Vanadium-Alloys Steel Co., Latrobe, Pa., becomes chairman of the Canadian company.

Simpson Electric Co., Chicago, appointed **Jack Whiteside** general manager, a position formerly held by the late **H. A. Bernreuter. Larry Patterson** was made director of material and is succeeded as purchasing agent by **Jim Werner. Al Arbeiter** was made chief meter engineer, and **Bill Coon** was appointed director of engineering.

Edgar J. Holcomb, assistant fabricating works manager at the Massena, N. Y., operations of **Aluminum Co. of America,** trans-

LORIN L. FERRALL

JAMES D. GLENN

. . . Crucible operations and sales appointments

fers to company headquarters in Pittsburgh.

L. P. Stringer was named engineering manager, **Redmond Bros. Inc.**, San Gabriel, Calif.

G. S. Rigdon was named general manager of **Willys Motors Corp.'s** Oakland, Calif., aircraft division at San Leandro, Calif.

Richard F. Mack was elected president, **Anti-Corrosive Metal Products Co. Inc.**, Castleton-on-Hudson, N. Y. He succeeds **Mrs. E. F. Bainbridge**, resigned. Mr. Mack retains his former title of treasurer.

Lorin L. Ferrall was elected vice president of operations, and **James D. Glenn** was appointed general manager of sales for **Crucible Steel Co. of America**, Pittsburgh. **George W. Stamm** was made assistant general manager of sales. **R. S. Poister**, former vice president-operations, and **Walter H. Wiewel**, former vice president-sales, were named senior vice presidents. They will devote full time to problems of over-all policy.

James G. Rayburn was appointed general sales manager, **Lamson & Sessions Co.**, Cleveland. He succeeds **Robert G. Patterson**, vice president-general sales manager, who remains as vice president. Formerly assistant general sales manager, Mr. Rayburn has been a director since 1953.

William E. Haskell was appointed division superintendent, west mills, at **U. S. Steel Corp.'s** Gary, Ind., steel works. **John M. Walsh Jr.** was made assistant to the general superintendent.

Jay Friedman was appointed eastern district representative of **Erie Sheet Steel Corp.**, Cleveland. **Donald L. Timony** was made central district representative.

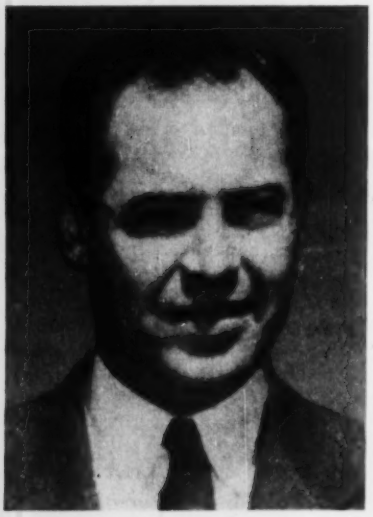
C. E. Amos was made administrative assistant to the vice president-production, **Jones & Laughlin Steel Corp.**, Pittsburgh.

T. A. Burress was made director of tank sales of **Heil Co.**, Milwaukee. He is succeeded as sales manager, tank division, by **Joseph F. Heil Jr.**

G. F. Ryan was made New York district sales manager for **Leschen Wire Rope Division**, H. K. Porter Co. Inc.

E. K. Sutherland was made manager of the newly created automation engineering department at **Corning Glass Works**, Corning, N. Y.

R. K. LeBlond Machine Tool Co., Cincinnati, appointed **Harold J. Siekmann** vice president. Mr. Siekmann became chief engineer in



RICHARD F. MACK
. . . heads Anti-Corrosive

JAMES G. RAYBURN
. . . Lamson & Sessions gen. sales mgr.

HAROLD J. SIEKMANN
. . . LeBlond Machine Tool v. p.

350 Foot Automation Line Performs 555 Operations on V-8 Cylinder Blocks

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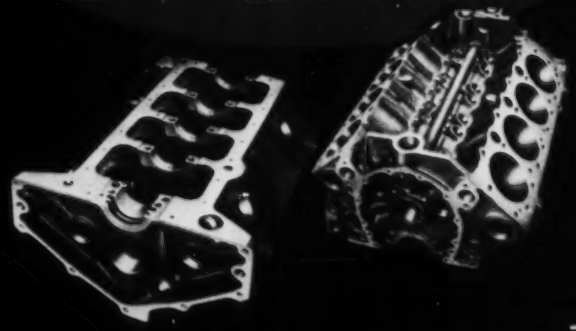

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- ★ Capacity for removing work piece at every station.
- ★ Automatic independent transfer mechanism for each machine section and automation units for handling parts from machine section to machine section.
- ★ Automatic air pressure test for high pressure oil holes and automatic depth inspection for all holes before tapping.
- ★ Pre-set tooling throughout.
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CONDE HAMLIN
. . . DeWalt executive v. p.

1944, duties of which he retains in his new position.

Colson Corp., Elyria, O., named **T. J. Bromeling** manager of industrial sales, and **W. C. Shea,** manager of institutional sales. Mr. Bromeling formerly was assistant sales manager, Service Caster & Truck Corp., assets of which recently were purchased by Colson.

Raymond & Dickey Inc., Pasadena, Calif., named **Guy Kirby** sales manager and **William B. Jenkins** vice president-manufacturing.

Butler Mfg. Co., Kansas City, Mo., elected **John A. Morgan** to the newly created post of executive vice president and **Walter L. Smith** to vice president-engineering and production. Mr. Morgan has served as general manager since 1951, and as a director since 1952.

Thermal Transfer Corp., Pittsburgh, appointed **Robert J. Sahr** to the newly created position of vice president in charge of sales. Since joining the firm in 1952, he has served as a sales engineer. He formerly was metallurgical development engineer, Silver Steel Co., Denver.

Ralph W. Shaw Jr. was elected president, **A. R. Purdy Co. Inc.**, Lyndhurst, N. J., to succeed the late **Arthur R. Purdy. H. Lee Moss** was made vice president-secretary, and **G. E. Rittenhouse,** vice president-sales.

Charles J. Haring was made director of equipment sales, **Westinghouse Air Brake Co.**, Pittsburgh. He joins the firm's executive staff after serving as general sales manager of J. D. Adams Mfg. Co., Indianapolis.

Conde Hamlin, vice president-sales and a director of **DeWalt Inc.**, Lancaster, Pa., was elected executive vice president of this American Machine & Foundry Co. subsidiary.

Jefferson C. Falkner, former manager of electric production for Consolidated Edison Co., joined **Copes-Vulcan Division,** Continental Foundry & Machine Co., Erie, Pa. He will serve as an engineering and customer consultant in development of new equipment for modern steam power plants.

Elmer Weaver was elected vice president, **Union Oil Co.**, Los Angeles.

Lamson & Sessions Co., Cleveland, assigned **Louis W. Beushausen** representative for the six-state New England territory.

OBITUARIES . . .

Dr. Richard H. Patch, 66, vice president-operations, **E. F. Houghton & Co.**, Philadelphia, died Nov. 13.

Louis A. Schmidt, 56, production manager, vessel department, **A. O. Smith Corp.**, Milwaukee, died Nov. 16.

Waldon C. Houston, 43, assistant sales manager, **Wagner Iron Works,** Milwaukee, died Nov. 14.

H. Winfield Chapin, 86, a former president of **Brown-Lipe-Chapin Co.**, Syracuse, N. Y., died Nov. 18.

Burtner Fleeger, president, **Oklahoma Steel Castings Co.**, Tulsa, Okla., died Nov. 12.

Harry F. Minnick, 46, chief engineer, **Wagner Iron Works,** Milwaukee, died Nov. 20.

Alfred J. Beverung, 69, retired president, **Federal Tool & Engineering Co.**, Milwaukee, died Nov. 22.

William A. Ring, 59, engineering design specialist at **Convair,** San Diego, Calif., a division of General Dynamics Corp., died Nov. 15.

Thomas H. McGraw Jr., 77, retired president, **Braeburn Alloy Steel Corp.**, Pittsburgh, died Nov. 22.

John J. Regan, 60, owner, **Philadelphia Steel & Iron Co.**, Conshohocken, Pa., died Nov. 20.

Clarence F. Jensky, plant manager, **Federal Pacific Electric Products Co.**, Scranton, Pa., died Nov. 22.

Announcing...

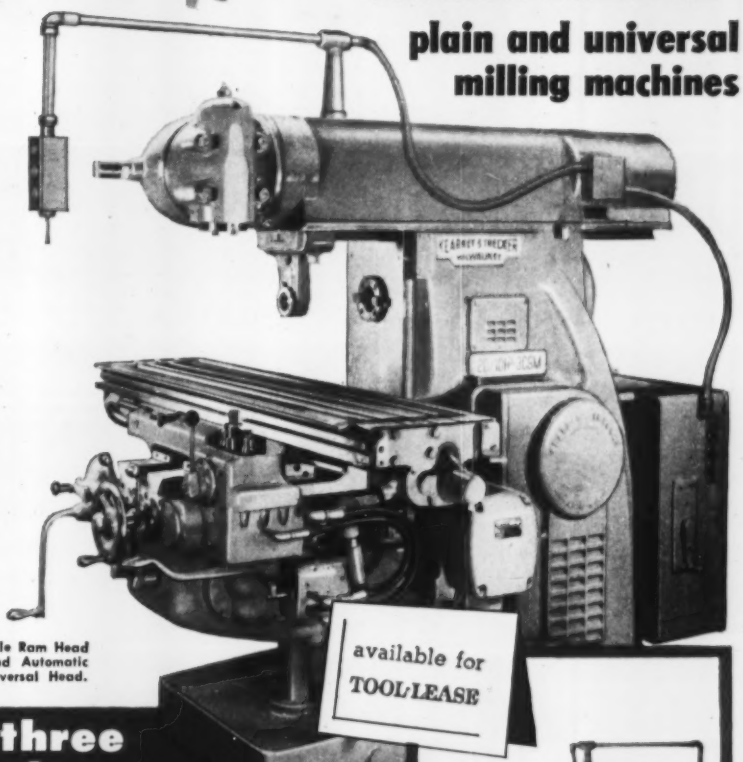
Kearney & Trecker's *NEW* RAM HEAD

plain and universal milling machines

KEARNEY & TRECKER'S new line of Ram Head milling machines combines a conventional horizontal spindle and a self-contained motorized sliding ram. As a result, horizontal and vertical spindles can be run separately and simultaneously.

The Ram Head machines are available with a choice of three heads — Universal, Vertical and Quill types which can be rotated through 360°. You can perform vertical, horizontal and angular milling on one machine *in a single setup.* They are built in Model CH, CK and CSM designs with 69 different machines in sizes from No. 2 to No. 4 in both plain and universal styles. Machines may be equipped with either Standard Directional Table Control, or Mono-Lever and Automatic Cycle Table Control.

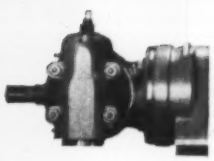
For the full story, contact your nearest Kearney & Trecker representative, or write Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.



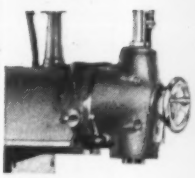
20/10hp No. 3 Model CSM, Plain style Ram Head milling machine with Mono-Lever and Automatic Cycle Table Control and Type U Universal Head.

available for TOOL-LEASE

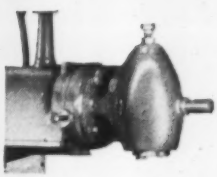
with choice of three types of heads



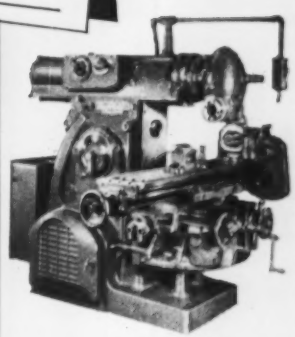
Type U Universal Swivel Head
Capable of numerous milling combinations, this Ram Head has two graduated bases at right angles to each other, both of which can be swiveled thru 360°.



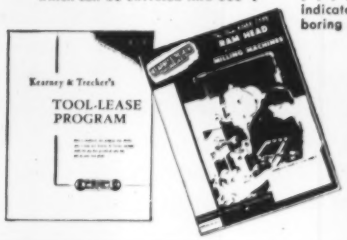
Type Q Adjustable Quill Swivel Head
Spindle can be set at any angle through 360°. Ram Head has 3½" hand-feed quill movement . . . micrometer stop and dial indicator for angular milling or boring of more than one height.



Type V Vertical Swivel Head
Especially adapted for vertical and angular milling. Spindle housing base is graduated and spindle can be set at any angle thru 360°.



7½ hp No. 3 Model CH, Universal style Ram Head milling machine with Standard Directional Table Control and Type U Universal Head.

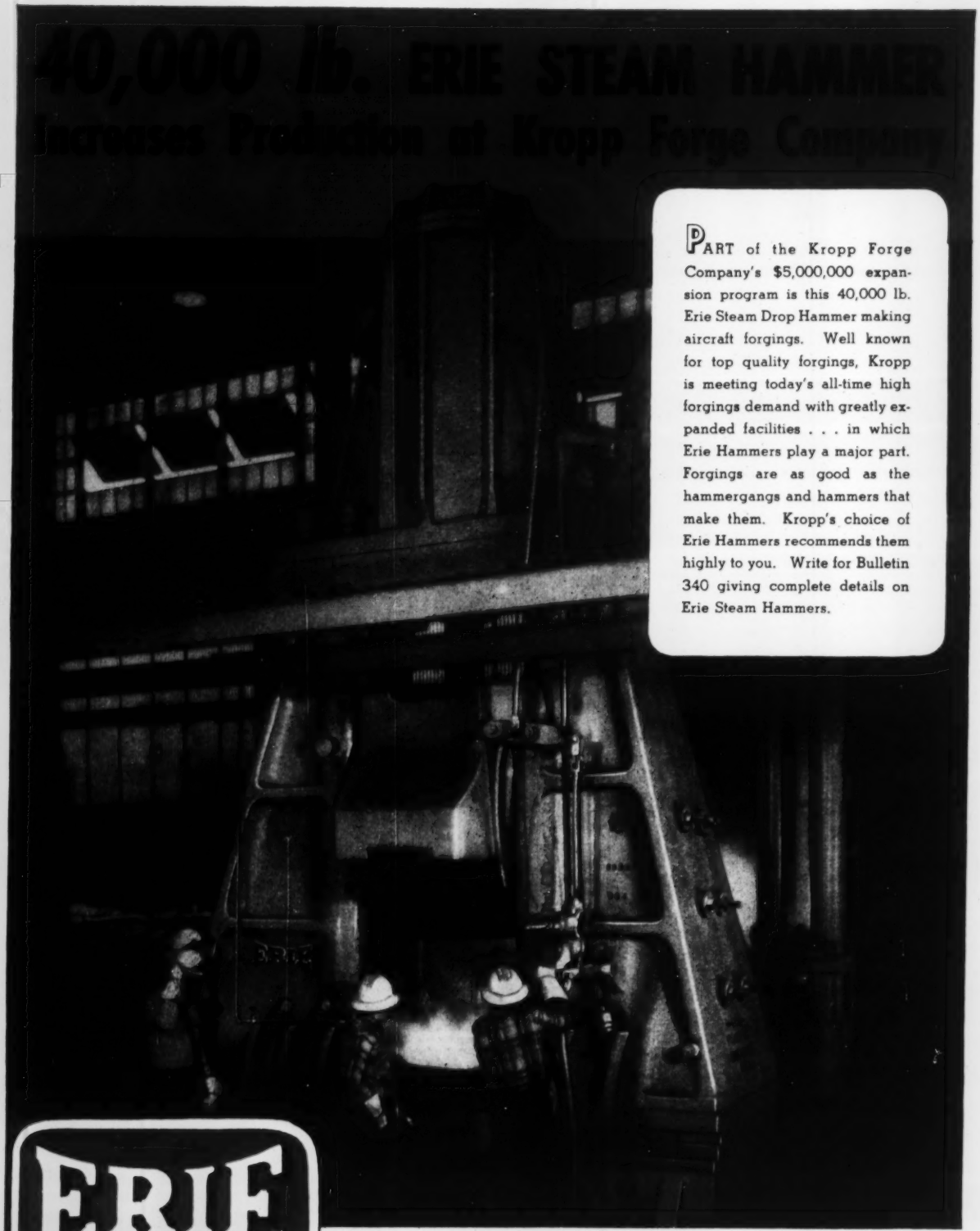


FREE CATALOGS!
Ask for catalog No. RH-10A for complete data on Ram Head Plain and Universal milling machines, and Tool-Lease bulletin, TL-10A. Also see our catalog in SWEET'S.

Kearney & Trecker Corporation

MILWAUKEE 14, WISCONSIN

40,000 lb. ERIE STEAM HAMMER
Increases Production at Kropp Forge Company



PART of the Kropp Forge Company's $5,000,000 expansion program is this 40,000 lb. Erie Steam Drop Hammer making aircraft forgings. Well known for top quality forgings, Kropp is meeting today's all-time high forgings demand with greatly expanded facilities . . . in which Erie Hammers play a major part. Forgings are as good as the hammergangs and hammers that make them. Kropp's choice of Erie Hammers recommends them highly to you. Write for Bulletin 340 giving complete details on Erie Steam Hammers.

ERIE

ERIE FOUNDRY COMPANY ERIE, PENNSYLVANIA

Dependable FORGING HAMMERS • HYDRAULIC PRESSES

Norton To Build in South

Electric furnace facilities will be constructed in Huntsville, Ala.

NORTON CO., Worcester, Mass., will add to its electric furnace capacity by building a plant in Huntsville, Ala. Ground will be broken late this year, with completion expected by the end of 1955. Total cost of land, buildings and equipment is estimated to be $1,250,000.

The Alabama plant will produce Magnorite refractory grain (fused magnesia), fused zirconia, Norbide refractory grain (boron carbide) and special products for the Atomic Energy Commission. Norton may also manufacture crude aluminum oxide and silicon carbide at Huntsville.

Decentralization — The firm's electric furnace facilities are now at Chippawa, Ont., and Cap-de-la-Madeleine, Que. Decentralization of these facilities was an important factor in choosing the Huntsville location.

Over-all operation of the plant will be directed by Howard J. Daly, electric furnace plant manager in Chippawa.

The company produces abrasive grain, grinding wheels, pulpstones, grinding and lapping machines, encapsulating machines, refractory and wear resistant products at its Worcester plant. Behr-Manning Corp., Troy, N. Y., maker of pressure sensitive tapes and distributor of oilstones and sharpening specialties made by Norton Pike Co., Littleton, N. H., is a subsidiary.

Officers of the company include G. N. Jeppson, chairman of the board, and M. P. Higgins, president.

Fairmount Steel Buys Franklin

Fairmount Steel Co. acquired Franklin Steel Co. and will consolidate operations at 896 E. 70th St., Cleveland. Leonard Copeland, president of Fairmount, says the additional space and facilities, including pickling, will enable his firm to expand operations. Fairmount Steel is a warehouse distributor and processor of steel sheet, strip, coil and plate. Franklin Steel was headed by Frank J. Ahern, president, and J. P. Terry, secretary and general manager.

Ace Heat Treating Renamed

Ace Heat Treating Co., Elizabeth, N. J., changed its name to Ace Metal Treating Corp. Added operations include still tank and barrel plating, heliarc welding, thread-rolling, silver brazing and black oxidizing. The company also does all types of heat treating, barrel finishing and blast cleaning.

Synthetic Mica Corp. Formed

Synthetic Mica Corp., a wholly owned subsidiary of Mycalex Corp. of America, Clifton, N. J., has been organized and is building a plant in Caldwell, N. J. This marks the beginning of a new industry which eventually may reduce the dependence of the U. S. on India for mica. The estimated annual output of the plant will be 1000 tons of high grade synthetic mica, about 5 to 10 per cent of the nation's current requirements.

U. S. Steel Moves Shop

United States Steel Corp., Pittsburgh, is moving its lightweight bridge flooring fabrication shop from McDonald Mills, McDonald, O., to American Bridge Division's plant in Ambridge, Pa. The shop shut down Nov. 15 and will reopen at Ambridge after Jan. 1. Steel for the flooring will be rolled at McDonald and Youngstown.

American Blower Opens Branch

American Blower Corp., Dearborn, Mich., opened direct factory branch offices at 921 S.W. Washington St., Portland, Oreg., and 517 Gettle Bldg., Ft. Wayne, Ind. Managers are: W. S. Cooper, Portland; J. W. Johnson, Ft. Wayne. The firm is a division of American Radiator & Standard Sanitary Corp., Pittsburgh.

Honeywell Opens Denver Unit

A research and product development center has been opened in Denver by Micro Switch Division of Minneapolis-Honeywell Regulator Co., Milwaukee. It will supplement research activities conducted at the division's main office and factory in Freeport, Ill. Wilbert Martin is in charge of the new facility.

Backbone for Tunnel

This tunnel shield with a cast steel edge is being pushed under Hudson river like a huge cooky cutter to form third $100-million tube of Lincoln tunnel. Shield is 31.5 ft in diameter, 18 ft long, weighs 240 tons

J & S Tool Gets Jahrl Rights

J & S Tool Co. Inc., Livingston, N. J., acquired manufacturing and distributing rights to the Jahrl milling chuck in the United States.

Downingtown Mfg. Buys Firm

Downingtown Mfg. Co., Downingtown, Pa., maker of machinery for the pulp, paper and paperboard industries, acquired Monarch Forge & Machine Works, Portland, Oreg., manufacturer of sawmill machinery and special equipment for other industries.

Kerr Heads New Avco Division

Avco Mfg. Corp., New York, established a West Coast Division to serve as a center of its expanded defense and industrial product interests in the area. Products include electronics, power plants, airframe components and precision parts. James R.

(*Please turn to page* 104)

More than a "Coolant"

KLEENKUT • SOLVOL • [illegible]DKUT • EXCELENE • THREDKUT •

...is needed....

As the cutting tool meets the workpiece and chips start peeling off...lubrication and temperature control become of prime importance. More than a "coolant" is needed now to produce the optimum in production, finish and tool life. The cutting fluid must have superior lubricity, temperature control and chemical activity to properly eliminate scuffing of the tool and workpiece, reduce frictional wear and provide high anti-weld characteristics to prevent metallic seizure.

The D. A. Stuart Oil Company's modern laboratory is constantly at work developing industrial lubricants that are *just right for your job!* These include straight oil type cutting and grinding fluids, water-mix cutting and grinding fluids, drawing and stamping compounds, and lubricating oils and greases for gears, bearings and machine tool ways. For the best guide to the *right* industrial lubricant that will save you time, money and material, contact "the Man in the Barrel", your Stuart Representative. He knows how to solve your industrial lubrication problems. Fill in the coupon below today...ask to have him call.

3 STEPS TO SUPERIOR PERFORMANCE

To help you select the right industrial lubricant to do the best job. Consider all three carefully.

1. LUBRICITY

The characteristic of an industrial lubricant that reduces scuffing of the work and tool. Proper lubricity can eliminate rough finish, stop tearing of threads and sharp edges and promote proper chip formation.

2. TEMPERATURE CONTROL

Temperature regulation helps provide maximum efficiency—ignored, it can ruin efficiency. Excessive heat can change the character of a metal—temperature fluctuation will cause irregular chip formation or may even make it impossible.

3. CHEMICAL ACTION

Additives are introduced to industrial lubricants to produce super lubricity and anti-weld characteristics that prevent scuffing and seizure. However, chemical activity must be *carefully balanced* and *controlled* to meet job conditions and provide best results. Too much additive causes excessive wear . . . too little results in scuffing, seizure and rough finish.

THE Stuart TRIANGLE

Represents the pooling of experience and technical information from Stuart's Laboratory, field men and product users regarding the selection of the *right* cutting fluid to do the best job!

"The Man in the Barrel" knows how to obtain superior performance with industrial lubricants. When you're in doubt . . . contact Stuart Oil Company.

CLIP TO YOUR COMPANY LETTERHEAD AND MAIL TO

D. A. Stuart Oil Company
2735-37 S. Troy Street, Chicago 23, Illinois

☐ Please have Stuart Representative call.

☐ Please send copy of booklet titled Stuart's Cutting Oil Bases.

Name .....

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D.A. Stuart Oil CO.
EST 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

2735-37 S. Troy St., Chicago 23, Illinois

***In Canada:* Canadian D. A. Stuart Oil Co., Ltd.**
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THREDKUT 99 • SUPERKOOL • CODOL • DASCO • STURACO E. P. LUBES

How America out-produces the world
Air operated Alligator Switch in line at right shunts brass coils to center storage loop or to by-pass line in foreground. An air operated Stop and Feed Section serves Downender, in lower left corner, feeding coils to pickle tanks for rerolling.

No. 10 OF A SERIES

AMERICAN INDUSTRY—"makes more room in the same space"

Increasing the output-per-square-foot of plant area is an established American business principle. A contributing factor is correctly engineered conveying equipment.

Logan Conveyors frequently save the cost of a plant addition by handling a greatly increased volume of work in existing quarters. In any event Logan equipment steps-up output wherever used, relieves congestion, promotes a smooth, continuous flow along production lines.

There is a Logan Conveyor engineer near you, and remember you always get that certain plus value when you specify "Logan" Conveyors.

LOGAN CO., 535 CABEL ST., LOUISVILLE, KY.

Logan Conveyors

(Concluded from page 101)

Kerr is director of the West Coast Division.

Smelter Gets Dock Facilities

Barge shipments from St. Joseph Lead Co.'s smelter plant at Monaca, Pa., will be facilitated by a new dock constructed for the company on the Ohio river by Dravo Corp.'s Contracting Division, Pittsburgh. Central point of the dock is a 31-ft diameter cell of steel sheet piling to support a whirler crane that will transfer zinc from the shore to barges.

Republic Buys Coal Mines

Republic Steel Corp., Cleveland, acquired the coal mining properties of Ford Colleries Co., near Pittsburgh. The property, consisting of the Francis and Berry mines, adjoins Republic's Russellton mine. Republic will expand its Russellton operations into the new property. The mines are located in a favorable freight rate zone for shipment to the by-product coke ovens in Republic's Ohio steel plants.

Sound Without Echoes

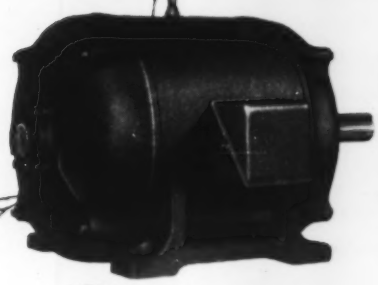
A large power transformer is being sound tested in General Electric Co.'s new anechoic (without echoes) chamber at Pittsfield, Mass. This chamber is the main part of a new $1.5-million sound laboratory built for GE's power transformer department. At right, a technician places a microphone near the transformer

Mammoth press mashes auto into small bale . . .

Into the world's largest press goes a junk auto . . .

Two minutes later it emerges . . . *a bale measuring only 2x2x5 feet!*

Power for the tremendous 1,018-ton hydraulic pressure was produced by five 100 H.P. Century motors.



5 Century Performance-Rated© MOTORS provide the 1,018-ton "muscle"!

Century motors are Performance-Rated to fit all kinds of applications, including unusual ones like this. These 5 motors combine precisely the correct horsepower, speed, torque, frame protection and mounting for efficient operation of this huge press.

Whatever your motor needs, you can depend on Performance-Rated Century motors to develop *all* the performance that's built into your modern production equipment. And, because they are so carefully matched to the job, Century motors give maximum service life.

For Performance-Rated output, specify Century motors on your new equipment. For Performance-Rated replacement motors, call your nearby Century Authorized Distributor, or contact our branch office.

Performance-Rated© Century C MOTORS

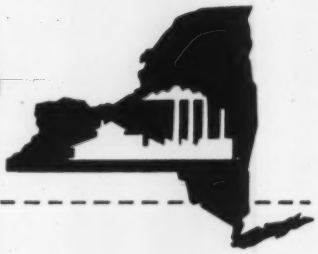
CENTURY ELECTRIC COMPANY

887

1/8 to 400 H.P.

(Advertisement)

plant-location news



Find the labor you need . . . where you need it

"I want cross-helical-coiler operators for my new plant. As well as tufters and grommeters to work on finished assembly. Can you tell me where to find them?"

Chances are your labor requirements for a new plant location won't be as unusual as these. But they'll probably need just as much specialized information and fact finding. You'll have to know where the right labor force is located or can be recruited, prevailing rates for a wide range of job titles, age, sex, and skills of available workers and up-to-the-minute details on union-management relations. Our Industrial Location Service knows *all* these facts—and many more—for every locality in New York State. And we'll be glad to send you exactly the information you need quickly and without cost, on sites that meet your particular requirements.

Facts and figures . . . tailor-made

ILS labor specialists prepare reports giving a detailed breakdown of the labor force. You'll get an accurate estimate of the percentage of the labor force now available at new sites.

And ILS can also supply rates for various labor skills, or ranges of rates for more general labor requirements. Along with this you can get data on the availability of male and female workers, the number of people adaptable to precision work, and facts on recognized training schools for workers.

The ILS labor team constantly studies new developments in the industrial-labor field. As a result, we're in a position to offer the best possible facts on labor at specific New York State locations.

One other thing about this free ILS service—all inquiries are handled in strictest confidence, so that no undue interest or speculation is aroused in the field.

Other free plant-site services

Labor won't be your only concern when you're looking for a new plant location. But no matter what factors are involved, ILS can be of help. Reports are available on transportation, markets, raw materials, water, buildings and sites, and local laws and regulations—to mention just a few. These surveys are tailored to meet your requirements, and sent to you quickly without cost or obligation—and in strictest confidence.

Our booklet called "Industrial Location Services" shows how you can put this valuable plant location data to work. To get your free copy, just drop me a card, care of the New York State Department of Commerce, Room 881, 112 State Street, Albany 7, New York.

Ronald B. Peterson

Director, Industrial Location Service

Shieldalloy Corp. Expands

New Jersey plant begins full-scale production of special alloys and ferroalloy powders

SHIELDALLOY CORP., New York, has installed facilities at its Newfield, N. J., plant for full-scale production of special alloys, processed minerals and ferroalloy powders for welding rod manufacturing, steel, ceramic and chemical industries.

Materials produced at the Newfield plant include high-quality chromium and other metals used in the manufacture of special alloys, particularly for jet engine applications. Tungsten melting base alloy, widely used in tool steel manufacture, also is produced there. Because of its low melting point, this high-recovery product is answering many tungsten alloy problems in steel foundries.

Special Alloys—With the new facilities, a major step in Shieldalloy's expansion program, the company has expanded its line to include such special alloys as titanium-aluminum and zirconium-aluminum. The company says it can economically make custom alloys of two or more constituents for research and experimentation.

Known as specialists in the field of coating ingredients for the welding rod industry, Shieldalloy supplies a full range of ferroalloy and mineral powders. The firm also produces pure iron carbonate and "extra high" carbon ferrochrome.

Foxboro Opens Plant in West

Foxboro Co., Foxboro, Mass., manufacturer of industrial instrumentation, opened an instrument service and assembly building at 399 Preda St., San Leandro, Calif. The factory more than doubles the company's West Coast manufacturing facilities.

Clary Renames Division

As part of the broadened scope of its guided missile and aircraft component production program, Clary Multiplier Corp., San Gabriel, Calif., changed the name of

(*Please turn to page* 109)

As a companion to its line of Type M Unibrake Motors with magnetic braking . . . Master now offers a line of Type D Unibrake Motors with dynamic braking.

HOW IT WORKS. Dynamic braking is obtained with a patented* unique, multi-polar brake winding superimposed on the stator winding of any Master single-phase or polyphase induction motor.

ADVANTAGES. Unibrake motors with dynamic braking are very compact, usually no larger than the standard motor. And since the dynamic brake has no moving parts, there is no wear . . . nothing to adjust . . . braking torque remains uniform.

INCREASE PRODUCTION. Don't waste valuable production time waiting for machinery to coast to a stop . . . get quick slow-down for machine tool spindles . . . quick turn-around time on many operations . . . speed up automatic cycling of machinery. And since Type D Unibrake Motors come to a rolling stop, they are particularly adaptable to equipment requiring gear shift between cycles.

SIZES. Now available up to 30 horsepower . . . larger ratings are being developed. Master Gearmotors and variable speed drives can also be supplied with Type D Unibrakes.

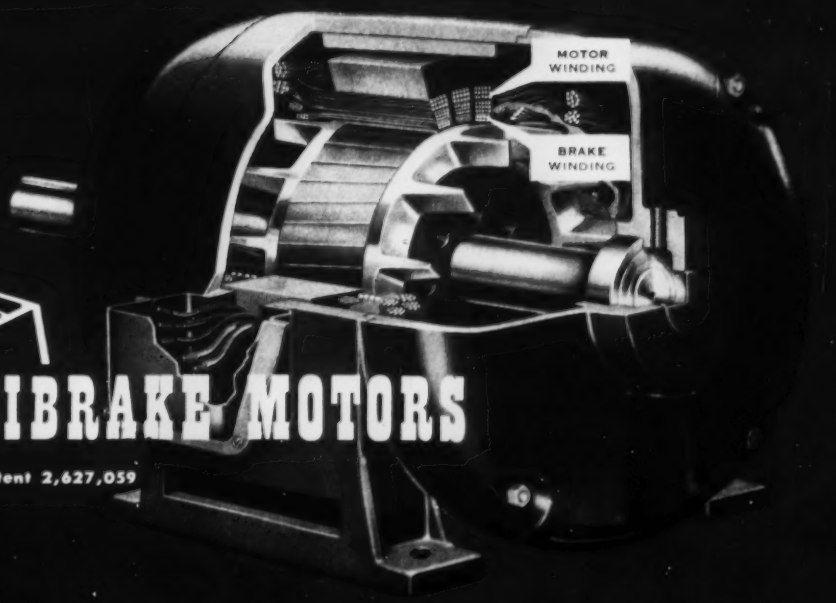
LITERATURE. For complete information write for Data 3810.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

Now

DYNAMIC BRAKING

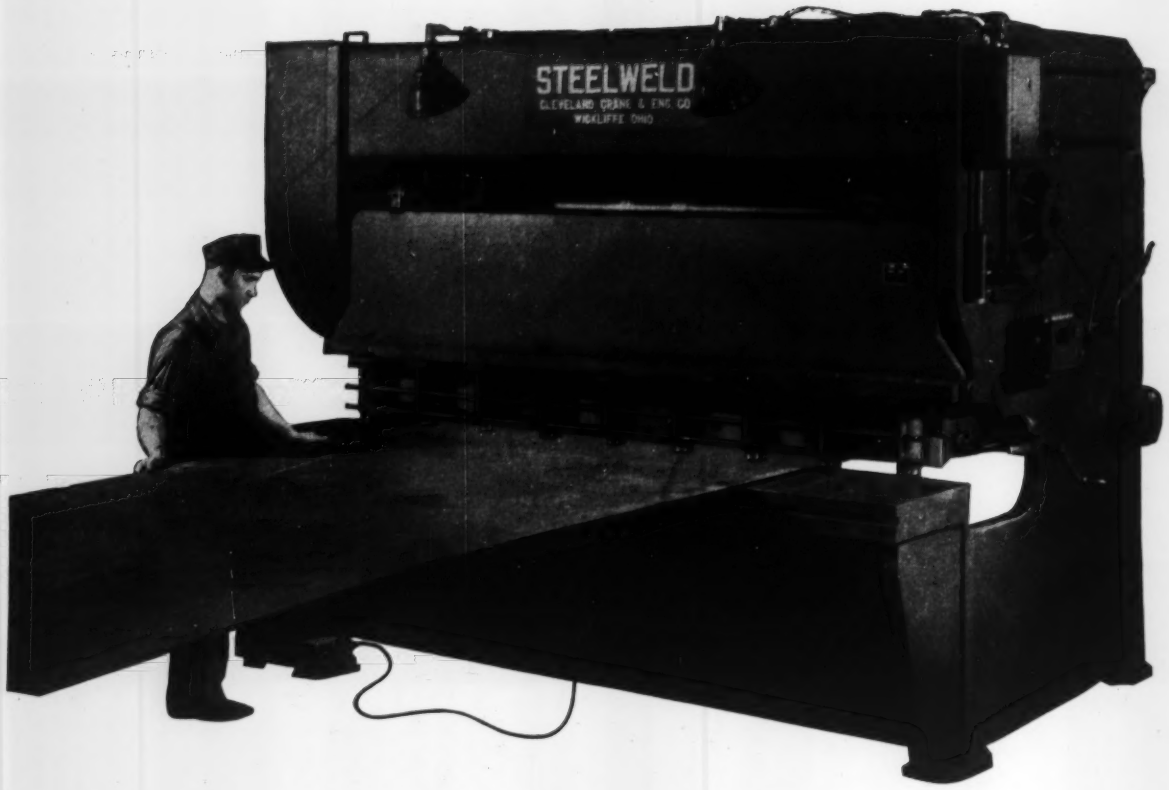
for A-C motors



MASTER

UNIBRAKE MOTORS

* U. S. Patent 2,627,059



ALL STEELWELD SHEARS
CONTROLLED ELECTRICALLY...

OPERATION of Steelweld Shears is unusually easy and convenient. There is no tiresome lifting of the leg to work a foot treadle. Slow, fatiguing knee action has been replaced by fast easy toe action.

A safety type electric foot switch is used. It can be slid around the floor wherever most convenient. It enables shearing speeds not attainable with foot treadles for certain cutting operations.

For instance, when cutting narrow strips from a long sheet, the operator can push the sheet at the end and control the shear at the same time. He need not be near the machine. As the sheet becomes shorter he can move the switch along with his foot to always be within easy reach.

There is no extra charge for electrical foot control on Steelweld Shears — it is standard equipment on all size machines.

Steelweld Shears are radically different from all other shears with many outstanding features. Get the facts on these truly new and modern machines. Learn about the advantages they offer you.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7803 EAST 282ND STREET, WICKLIFFE, OHIO

STEELWELD PIVOTED BLADE SHEARS

(*Concluded from page* 106)

its Instrument Division to Automatic Controls Division. The division makes gyroscopes, servomechanisms and precision valves for automatic control systems.

Equipment Maker Opens Plant

Pressure Products Industries, manufacturer of specialized high-pressure chemical process equipment, has begun operations in a $50,000 plant at Hatboro, N. J.

ACF Industries Buys Firm

ACF Industries Inc., New York, purchased Engineering & Research Corp., Riverdale, Md., developer of production tools and components for aircraft. The firm also placed in operation its $1-million plant in Buffalo which is heavily involved in work for the Atomic Energy Commission.

Sutton Forms New Department

Sutton Engineering Co., Bellefonte, Pa., established headquarters in the First National Bank building, Pittsburgh, for its hydraulic equipment department. The firm makes straighteners, extrusion presses and auxiliary hydraulic equipment for the steel and nonferrous metal industries. Donald E. Russell is sales manager and Walter F. Larson is chief engineer of the new department.

Milwaukee Firm Changes Name

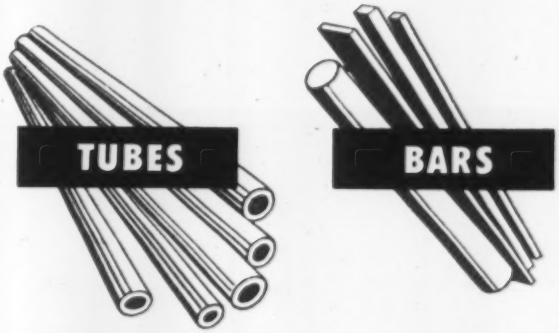
Milwaukee Hay Tool Co., Milwaukee, changed its name to Milwaukee Tool & Equipment Co. Inc. The firm makes farm tools and equipment and hardware vises. It also makes, on contract, railroad car hand brakes. Castings are supplied to the firm by its affiliate, Milwaukee Malleable & Grey Iron Works.

Lester Buys Phoenix Machine

Lester Engineering Co., Cleveland, designer of injection molding and die casting machinery, purchased Phoenix Machine Co., that city. Lester-Phoenix Inc., sales agency for the company, will be operated as a wholly owned

(*Please turn to page* 112)

World's largest stocks of
52100
STEEL TUBING and BARS



Write for the latest stock list

Contact our nearest office or write to Peterson Steels, Inc., Springfield Road, Union, New Jersey. Address: Dept. S

PETERSON STEELS, INC.
UNION, NEW JERSEY

BIGGEST!

This Betts 100 Inch Worm and Rack-driven Slotter is the largest ever built in America.

It is more than 30 feet high and weighs over 140 tons.

The table has a load carrying capacity of 75 tons and the bed measures 9 feet across the ways.

Seventeen motors are required for its operation.

This big Betts Slotter has a reversing planer-type variable-voltage motor drive. All machine functions are push button controlled and the circular work table has General Electric ultra-precise electronic indexing.

CONSOLIDATED MACHINE TOOL

Wholly owned subsidiary of Farrel-

CORPORATION, ROCHESTER, N.Y.

Birmingham Company, Incorporated.

(*Concluded from page* 109)

subsidiary. Officers of both companies are: David White, president; David J. Sloane, vice president; and H. A. Rocker, secretary and treasurer.

Will Build Fabricating Plant

Transmission Tower Division of Provincial Engineering Ltd., Niagara Falls, Ont., plans to erect a plant in that city for fabrication of electric power transmission towers. The plant will be built next to the company's galvanizing plant and will have 12,000 sq ft of floor space.

Cochrane Opens Sales Office

Cochrane Corp., Philadelphia, maker of water-conditioning equipment and steam specialties, opened a district sales office at 261 Madison Ave., New York. J. R. Denton is office manager.

Aget Mfg. Moves Divisions

Sales and manufacturing divisions of Aget Mfg. Co. have been combined at the company's headquarters, 1408 E. Church St., Adrian, Mich. The firm makes dust and vapor collectors.

Fleetwood Corp. Organized

Fleetwood Corp. has been organized to manufacture and supply television equipment. Headquarters are at 1037 Custar Rd., Toledo, O.

ASSOCIATIONS

Benjamin Z. Katz resigned his position as assistant to executive vice president, **Institute of Scrap Iron & Steel Inc.**, Washington.

Jervis C. Webb, president, Jervis B. Webb Co., Detroit, was elected president of **Conveyor Equipment Manufacturers Association.** R. C. Sollenberger was re-elected executive vice president and will be chief staff executive in the association's Washington headquarters. Other officers: Vice president, Fred S. Wells, Stephens-Adamson Mfg. Co., Aurora, Ill.; treasurer, E. E. Boberg, Standard Conveyor Co., North St. Paul, Minn.; secretary, R. B. Maas, Screw Conveyor Corp., Hammond, Ind. Directors are D. E. Davidson, Link Belt Co., Chicago; J. H. Walker, Fairfield Engineering Co., Marion, O.; A. W. Rich, Fairmont Machinery Co., Fairmont, W. Va.

K. F. Heath of Nutting Truck & Caster Co., Faribault, Minn., was elected president of **Caster & Floor Truck Manufacturers Association,** Chicago. Other officers: D. B. Anderson, Nagle-Chase Co., vice president; O. T. Henkle Jr., Mercury Mfg. Co., treasurer.

Albert F. Metz, chairman of the board and chief executive officer of Okonite Co., Passaic, N. J., was elected president of **National Electrical Manufacturers Association,** New York. He succeeds J. H. Jewell, vice president of Westinghouse Electric Corp., Pittsburgh. Vice presidents are: W. A. Elliott, Elliott Co., Jeannette, Pa.; F. F. Loock, Allen Bradley Co., Milwaukee; J. J. Mullen Jr., Moloney Electric Co., St. Louis; B. C. Neece, Landers, Frary & Clark, New Britain, Conn.; and W. V. O'Brien, General Electric Co., Schenectady, N. Y. Treasurer is A. A. Berard, Ward Leonard Electric Co., Mt. Vernon, N. Y.

Rates Tops in Packaging

Wirebound Box Manufacturers Association awarded top honors in 1954 competition to this package. After two cartons and foil bag are placed inside the master container, a piece of precisely-cut insulating material is placed on the bottom. The brake assembly hangs from a hoist that brought it direct from assembly line

REPRESENTATIVES

Luria Engineering Co., Bethlehem, Pa., appointed Taylor, Bishop, MacLean Ltd., Montreal, Que., and Robert H. Lightfoot, Houston, as dealer representatives in their territories. Luria Engineering designs and produces standard steel industrial buildings and hangars and other structural facilities for aircraft.

Snap-Tite Inc., Union City, Pa., appointed Norman Engineering Co., Chicago, and Rucker Inc., Oakland, Calif., as distributors of its swivel ball-bearing couplers in their territories. Rucker also maintains offices in South Gate, Calif., and Seattle.

Brush Electronics Co., Cleveland, appointed the following distributors for its instruments and accessories: F. A. Brady Inc., New York; P. A. Patterson Co. Inc., Philadelphia; and Production Tool & Gage Co., Rochester, N. Y.

Machinery Division, Dravo Corp., Pittsburgh, will continue as national distributor for certain products of Tri-Lok Co., which was purchased recently by Blaw-Knox Co. These products include mechanically interlocked ferrous and nonferrous flooring, concrete armoring, safety steps, welded steel grating and stair treads.

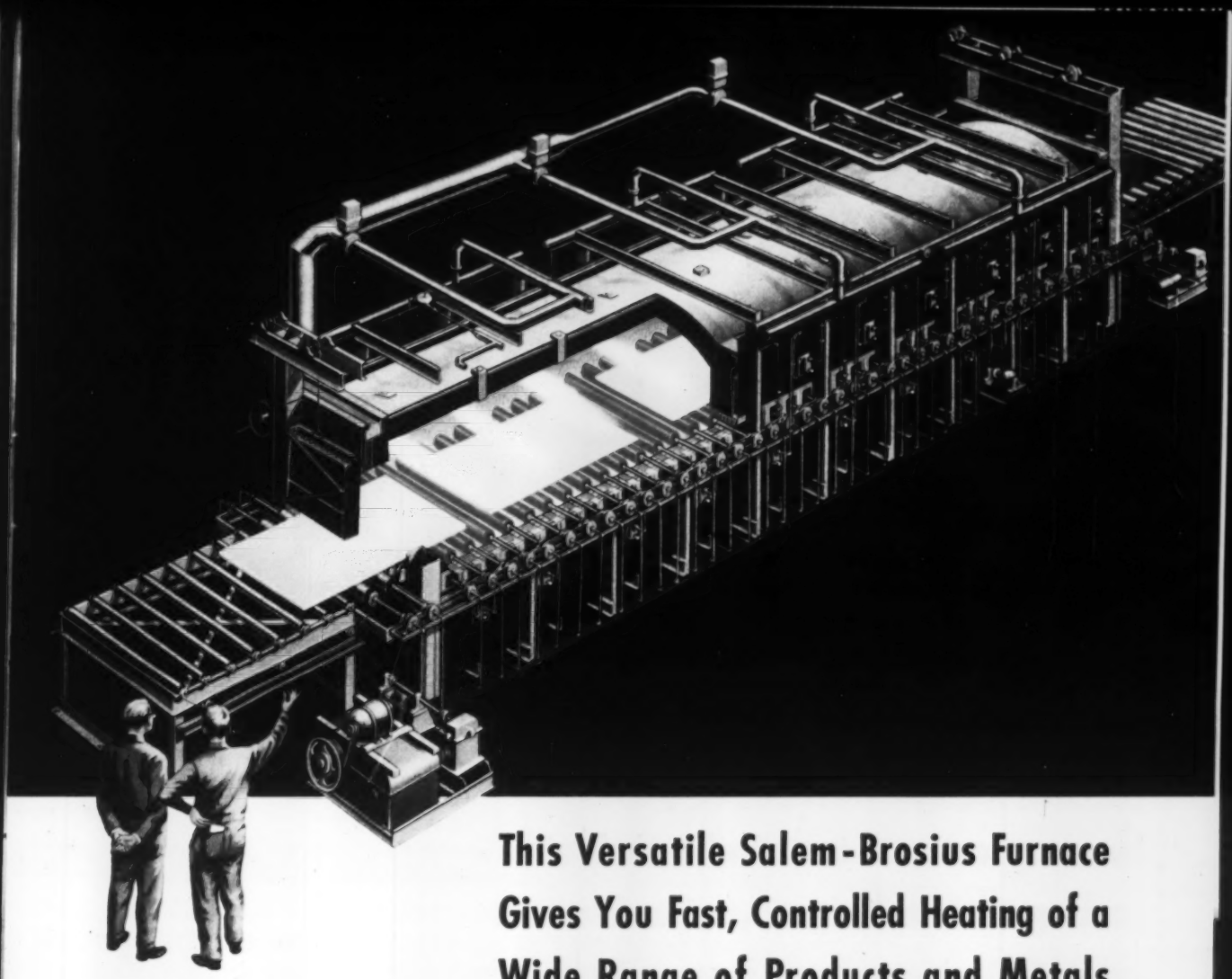
NEW ADDRESSES

Byrne Doors Inc., manufacturer of steel and aluminum doors, moved to larger offices at 1603 E. Nine Mile Rd., Detroit 20.

Blue M Electric Co. moved into its new plant at 138th & Chatham St., Blue Island, Ill.

American Motors Corp., Detroit, opened its Washington office at 712 Wire Bldg. The office will handle government and fleet sales.

Williams Gauge Co. Inc. moved its general offices to larger quarters in Two Gateway Center, Pittsburgh 22.



This Versatile Salem-Brosius Furnace Gives You Fast, Controlled Heating of a Wide Range of Products and Metals

This roller hearth furnace, designed by Salem-Brosius, gives you fast, automatic control of heating for a variety of shapes and types of metals.

High temperature non-ferrous alloys, steel, brass and aluminum in slabs, sheets, packs, flat bars—even trays of small parts—are heated in this type furnace. This installation heats high temperature alloy sheets to 2250°F at rates up to 7500 pounds per hour. Typical sizes of slabs and packs heated in this 38-foot furnace will range from 40 x 71 inches to 58 x 95 inches.

Heating is precisely controlled to within extremely narrow limits through three zones by automatic indicating-recording pyrometers and thermocouples.

The material moves through the furnace on a roller hearth which consists of a series of Hastelloy water-cooled rolls. This furnace has operated for more than 3800 hrs. without roll replacement—an outstanding achievement for such furnaces. Sound design and top-quality materials and components, such as efficient burners and devices for close control of operating temperatures are your assurance of long, trouble-free, economical operation.

As a leader in the field of designing, fabricating and installing precise heating and heat-treating furnaces, Salem-Brosius recently augmented its technical skills by the acquisition of the George J. Hagan Company—now offers you the combined special talents of both organizations in solving your heating problems. To learn how you may improve your heating practice, and increase production with economy, ask to have an engineer call. He will be glad to study your problem and submit a recommendation.

SALEM-BROSIUS, INC.

EXECUTIVE OFFICES: 248 FOURTH AVENUE, PITTSBURGH 22, PA.

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with bearing properties. Bronze wearplates in many sizes and shapes, with precision-machined details . . . holes, slots, grooves, bevels or recesses. Washers of bronze, steel or bimetal combination. We specialize in standard and special bearing parts. Engineering service. Quality control.

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FEDERAL-MOGUL

Also sleeve bearings in many designs and sizes; cast bronze bushings; bimetal rolled bushings; rolled split bushings; spacer tubes and bronze parts.

STEEL
December 6, 1954

Technical Outlook

SPELLED OUT— The efficiency of impact extrusion is improving every day. Take a look at the process if you use complex round, square rectangular, oblong, cup or shell-shaped parts or simple parts having a length-diameter ratio exceeding 2 to 1. Magnesium Co. of America is using a high speed single stroke process to turn out parts in magnesium, aluminum, lead, zinc, tin, copper and brass.

BETTER FINISH— Production research at Alcoa has supplied know-how for a better as-cast surface on aluminum die castings. Result will be a cheaper chrome plated finish.

TOUGHER BERYLLIUM WIRE— A new beryllium copper alloy wire has 65 to 70 per cent the conductivity of copper and resists fatigue from flexing and vibration. It withstands higher temperatures than ordinary copper wire. Called Silvercote No. 11, it's 0.5 per cent beryllium, 2.5 per cent cobalt, balance copper—with a light silver-plating that makes it easier to solder.

RUBBER HOSE CONVEYOR— B. F. Goodrich Co. is marketing a new spiral wire-reinforced hose that minimizes abrasive wear where metal pipe systems must turn corners or negotiate bends. Short lengths of hose flex easily and unlike curved pipe, can be rotated to distribute wear at these points. It's made in sizes from 1 to 14 in., for water pressures from 50 to 250 lb. Designed primarily for the mining industry, the hose can also convey such items as sand, ground chemicals or metal chips.

MORE CASTINGS FOR AUTOS—Castings will take a more prominent place in the automotive industry, James H. Smith, General Motors Corp. told the Foundry Equipment Manufacturers Association. As evidence, he pointed out that G-M's Central Foundry Div. will produce over 60,000 tons of pearlitic malleable in 1954 for use in casting applications not known a few years ago. Calcium carbide treatment gives a high test gray iron at low cost. This low sulphur iron has high mechanical properties with a lower Brinell hardness than is shown with regular cupola iron.

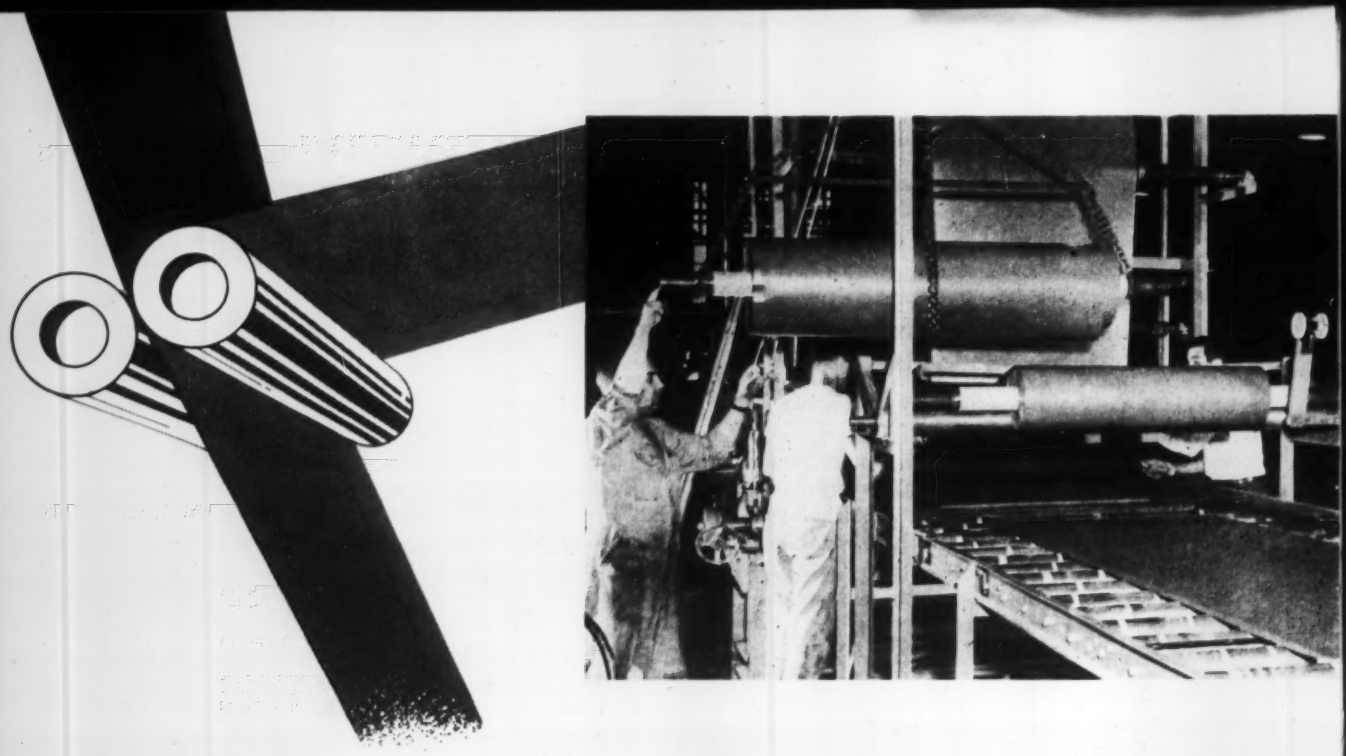
CERAMIC HELPS—General Electric says that one of the design improvements that gives added thrust to the F-86D fighter is a ceramic-coated inner liner which allows increased fuel injection. The liner acts as a radiation shield to prevent the hot gas from overheating the tailpipe skin when the extra fuel is injected into the afterburner.

CARBON CLEANS—Tiny granules of activated carbon packed between screens in thin panels are the basis for a process to remove industrial odors and fumes and recover valuable vapors from plant exhausts. Steam from the regular system can be used for regeneration.

BETTER BATTERY—Improvements in an Edison nickel-iron battery give 25 per cent more power without an increase in size. Positive tubes contain pure nickel flakes alternating with layers of nickel hydrate. Negative pockets contain iron. Electrolyte is a solution of caustic potash, plus a small percentage of lithium hydrate in distilled water. The battery is designed for industrial trucks.

STRONG WELD—Tubular sections welded from titanium sheet with argon shielding withstand pressures up to 600 psi before rupturing at the weld. Tests were made at Glenn L. Martin Co.

Metalworking Outlook—p. 65 *Market Outlook—p. 195*



When Metal Weds Plastic

By SAMUEL W. BAKER
Associate Editor

Producers believe they have a potential giant on their hands. Don't let present price scare you; it's due to drop when demand develops the technology

SHORT CUT to finished products —that's the promise of a new laminate which combines the protection and appearance of vinyl plastic with the rigidity and formability of metal.

Plasticized polyvinyl chloride used as a laminating material resists abrasion, corrosion and effects of heat, light and weather. Laminates maintain dimensional stability up to 250° F and will not support combustion. Bond strengths average 35 pounds per inch of width, depending on thickness of vinyl and the metal used.

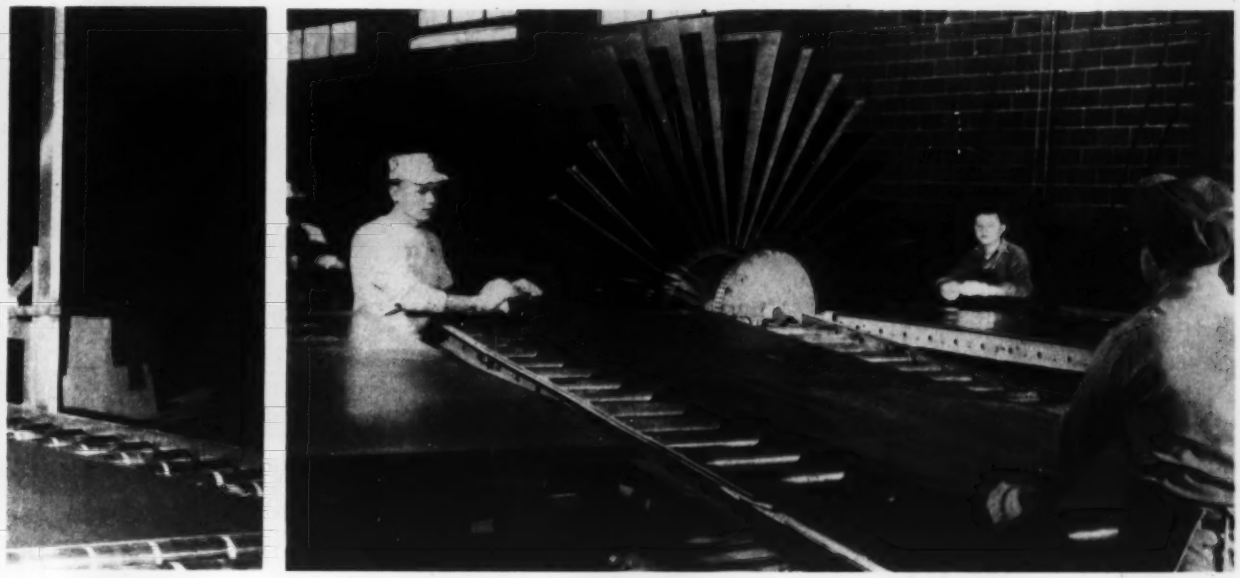
Versatility — Bonded to sheet metal with adhesive under heat and pressure, the vinyl can be applied to any flat surface of steel, aluminum or magnesium. Bonding to copper and other metals and alloys is possible, and studies are being made on durability and possible applications of these laminates. Nonmetallics have also been bonded with vinyl by similar methods.

Under controlled conditions, just about anything can be done with the laminates. Exceptions are: Welding, brazing or soldering. Material can be bent, stamped, deep-drawn, crimped, punched, drilled, roll-formed and sheared with only slightly modified metalforming techniques. Special dies and drawing compounds are not necessary.

Textured surface can be provided by embossing the plastic film or sheeting, or by stamping patterns into the laminate. Deep embossing requires heavier gage sheet; it's normally available in thicknesses to 0.020 in. and from some suppliers as high as 0.050 in. Unembossed film as low as 4 mils has been successfully laminated. Where deep drawing or bending operations are performed the heavier gages are recommended.

Comparing Costs — The laminates are cheaper than stainless steel, but more expensive than galvanized steel and somewhat higher than enameled stock. Competition generally will be with decorative finishes where styling makes the premium worthwhile or for functional finishes in which the vinyl surface is advantageous.

Cost of the laminate today ranges upward from about 30 cents per square foot, plus the cost of the metal. Alone, the



First commercial roller-method laminating, at O'Sullivan Rubber Corp. Adhesive coating on roughened sheet stock is dried and heated before vinyl film is applied, left. Sheets then move to continuous cooling rack, right.

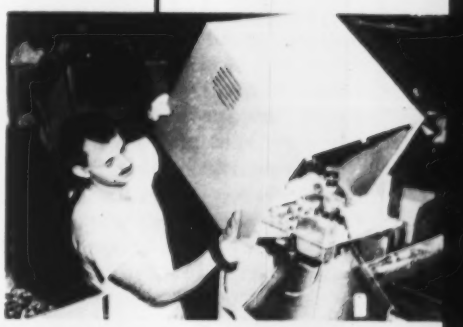
...A New Material is Born

Prefinished Sheet: Where you can use it

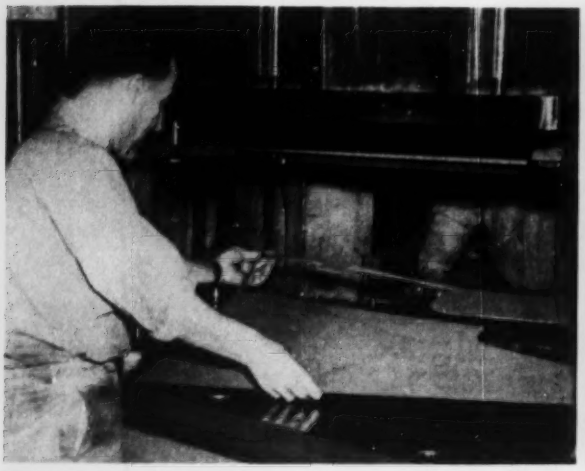
POTENTIAL uses for vinyl-metal laminates can be found where the protection of vinyl plastic and rigidity of metal are desired. Almost limitless pattern and color combinations are possible. Says O'Sullivan Rubber Corp.: "While the material is a natural for indoor uses, outdoor applications have not been proved, though many tests are under way. We believe within a year this material will be used in most of the applications listed." The list:

- Aircraft interiors
- Appliances
- Automobile interiors
- Building materials
- Business machines
- Bus interiors
- Containers
- Electrical apparatus
- Furniture
- Hardware
- Hospital equipment
- Housewares
- Luggage
- Office equipment
- Photographic equipment
- Radio and TV cabinets
- Restaurant seating
- Sporting goods
- Toys
- Vending machines
- Washing machines

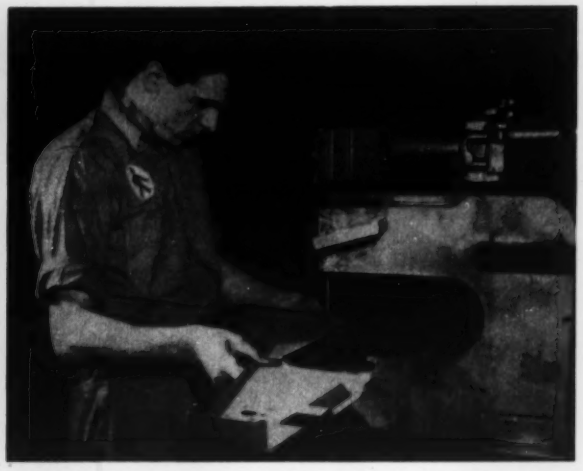
Pre-finished sheets punched, formed



for 1955 CBS-Columbia TV cabinets



BLANKING—Two pieces of business machine housing are punched from vinyl-steel laminate on 285-ton press. Paper is used to protect vinyl side during fabrication



RIVETING—Assembly clips are riveted to housing. Material can't be welded, soldered or brazed. As exposed parts must present unbroken finish, rivets can't show

specially formulated flexible and rigid unembossed film costs approximately 6 cents per square foot (10 mil thickness). Producers say a price of 20 cents per square foot plus metal is possible on present equipment, and high-speed processing equipment could lower the price a great deal.

Suppliers—Believed by Naugatuck Chemical Division, United States Rubber Co., to be "one of the most significant advances for the metals and plastics industries in the last decade," the technique is rapidly emerging from its development stages. Earliest successful laminating of vinyl plastic and sheet metal, and forming and drawing of the laminate, was by Hood Rubber Co. Division, B. F. Goodrich Co., in 1945.

Developments in roller methods of laminating were initiated by Naugatuck Chemical, and O'Sullivan Rubber Corp., which completed its manufacturing facilities this summer, was first in commercial production by the roller technique. At least two companies, Roll Coater Corp. and Enamelstrip Corp., are producing precision-slit coils laminated strip in continuous production lines.

Licensees — Naugatuck Chemical to date has licensed its Marvibond process to these companies: Acme Steel Co., Chicago; A-Jay Specialty Co., Naugatuck, Conn.; Barley-Earhart Corp., Portland, Mich.; Clad-Rex Steel Co., Denver; Eastern Venetian Blind Co., Baltimore; Jones and Laughlin Steel Corp., Pittsburgh; Enamelstrip Corp., Allentown, Pa.; Met-L-Wood Corp., Chicago; O'Sullivan Rubber Corp., Winchester, Va.; Roll Coater Corp., Pendleton, Ind.; Seiberling Rubber Co., Akron, O.; and Thomas Strip Div., Pittsburgh Steel Corp., Warren, O.

While process know-how is the secret of successful laminating, there are nine basic manufacturers of polyvinyl chloride resins, and a number of commercially-available special adhesives have been found practical for the bonding process. Material is available in a variety of colors, embossed or grained finishes, with vinyl on one or both sides or with vinyl on one side and baked-on finish on the other.

Who's Using It—Antenna masts of vinyl-coated aluminum were formed for American Airlines in 1945. Arm rests and seat side panels for Pullman cars have been made of vinyl-coated 1010 cold rolled steel. International Business Machines Corp.'s bank proof machine housings are made of pebble-grained steel-vinyl laminate. As downtime of these machines must be minimized, thus making refinishing a serious problem, use of the laminate more than offset the extra cost (up to $70 per machine). Some 200 housings a month are made for IBM by Karp Metal Products Co., Div. H & B American Machine Co., Brooklyn, N. Y., and Jamestown Metal Corp., Jamestown, N. Y.

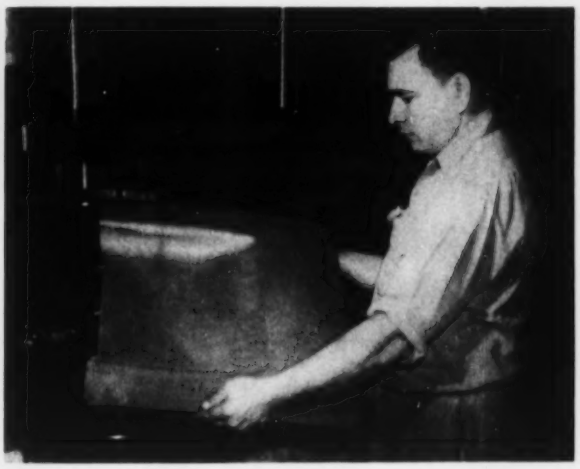
Traveling cases and instrument cases of vinyl-clad magnesium are expected to be on the market next

CHEMICAL RESISTANCE

Immersion tests (made by Naugatuck): 7 days at 25° C on 1 x 2 in. specimens in duplicate. Per cent weight change of the film in laminate is same as for unsupported film.

60% Sulphuric acid	−0.07%
25% Nitric acid	+0.40%
10% Acetic acid	+0.46%
10% Lactic acid	+0.24%
10% Hydrochloric acid	+1.51%
50% Sodium hydroxide	−0.07%
3% Hydrogen peroxide	+0.22%
Carbon tetrachloride	+40.04%
White gasoline	+4.82%
Mineral oil	+0.03%
Phenol saturated water	+20.01%
Ethyl alcohol	+1.49%
Toluol	+30.21%

DUTCH BENDING—High degree of bend on component edge of this complex reel door requires dutch bending, with laminate notched so steel will not cut into the vinyl



DEEP DRAWING—Highly polished dies and careful adjustment of die clearances allow deep drawing without special lubricants. Corrugated paper protects vinyl

year. Acme Visible Records Inc., Crozet, Va., will use an aluminum-vinyl material for office equipment. Kawneer Co., Niles, Mich., will offer building materials and architectural products from the material. Badgley Corp., Baldwin, L. I., N. Y., is investigating applications for corrugated vinyl-aluminum siding and shingles. Can companies are interested in using the thin film for its protective qualities.

Important—Four vital variables in production of the laminates are proper metal sheet surface preparation, type of adhesive, vinyl formulation and temperature. In hydraulic press bonding, as developed by Hood, a sheet of vinyl is placed on the dried cement-coated surface of metal and the assembly placed between embossing plates in the press. Typical cycle calls for heating and cooling in a multi-platen press for over-all time of 23 minutes.

In the roll method of bonding on sheets, metal is degreased in alkaline cleaner, rinsed and acid etched to roughen surface. An adhesive in solution is applied directly to the metal surface by roll coating. Thickness tolerance of 0.0025 in. on adhesive is held. Sheets move through a hot air (175-250° F) oven to dry the adhesive, and the adhesive coat is set up in an electric oven to the proper state of tackiness. Vinyl sheeting at room temperature is rolled on the metal by rubber rolls at low pressure (25-30 psi) and at a fairly sharp angle to prevent air entrapment. Total tolerance of plus or minus 0.005 in. or better is maintained.

Double Laminates — Jones & Laughlin container plants have been used as a testing ground for the laminates, coated on one or both sides with Marvinol film. It experienced no particular difficulty in stamping if minor adjustments for proper clearance are made. Dies must be in good condition to prevent damaging the plastic film. Simple draws can be made without lubricants; for more difficult operations a soluble oil lubricant or drawing compound with an oil base is used.

Roll curling and double seaming must be executed with care and at a slower rate. Changes in contour of the forming rolls may be required to eliminate cutting the vinyl coating. J & L has fabricated a container with conventional edged and bumped side seams, double seamed bottom and die curled top. Seamless pails have been drawn in four draws to depths providing a severe test.

Atmosphere Tests — Outdoor tests in industrial atmospheres for two years did not break down panels. Ducting made from the laminate has carried sulphuric and nitric acid fumes for a year without deterioration. Panels have been exposed to 100 per cent humidity at 160° F for 1000 hours without adhesion failure or blistering, and with only slight color change. Oven aging at 150° F for 600 hours had no perceptible effect on adhesion or color.

PHYSICALS

Properties of the film are variable within limits of physicals of semi-rigid vinyls. Tests by Naugatuck Chemical Div., U. S. Rubber Co. on a typical film (8 mm) show:

	Properties of Unsupported Film	Properties of Laminate
Ultimate tensile	4400 psi	Tensile of supporting metal
Ultimate elongation	170%	Elongation
Tear strength	910 lb in.	Dependent on metal gage
Bend brittle, ¼" rod	−5° centrigrade	−30° C
Reverse impact	Tears	120 in.-lb
Heat deformation at 120° centrigrade 2000 g. load	32%	30% (1 side)
Shrinkage 5 min. at 250° F	4.6% with calender grain	0.6%
	1.6% cross calender grain	None

In running the semi-automatic machine, the operator removes casting from die, lubricates the sprue area and inspects the casting

Progress in Magnesium

Two technical highlights of the

First Hot Chamber Die Casting

DIE CASTERS can soon start casting magnesium in hot chamber machines. Overcoming such difficulties as the molten metal shielding problem, Dow Chemical Co. has succeeded in devising a machine that does the job.

It can run automatically: The ingot charged at one end can be taken away as a die casting at the other end. The hot chamber unit offers four basic advantages: Virtually complete metal protection, low injection pressure, automatically controlled metal supply and a more efficient, improved machine.

How It Grew—Dow purchased a conventional 70-ton zinc hot chamber machine for development work back in 1944. First efforts were along the lines of

Zinc immersion is the heart of the process. Parts are cleaned of magnesium oxide and at the same time given a thin zinc coating

First Commercial Electroplating Success

MASS PRODUCTION electroplating of magnesium is a reality. Using the Dow process with an added wrinkle, Goddeyne Mfg. Co., Bay City, Mich., is plating hundreds of thousands of die-cast rule cases for Lufkin Rule Co.

A considerable amount of pilot plant work and limited job shop production preceded the decision to undertake this job. It requires a satin chrome finish that doesn't show scratches, but the process can produce the familiar, buffed mirror finish. A nine-step sequence does the job.

Removing Contaminants—First step is to remove nonmetallic contamination from the parts of the castings that will receive no further mechanical cleaning. This is done in an aqueous solution of chromic, concentrated nitric and hydroflouric acids.

Pickling takes from one to three minutes in a Koro-

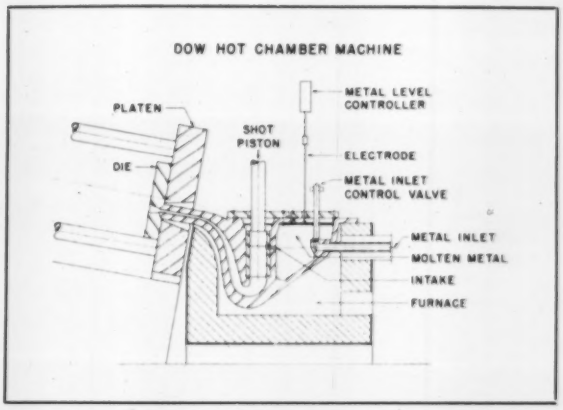
flux-covered pots, but this design was discarded in 1949 in favor of a closed unit. Now, the equipment consists of a supply pot or furnace with sufficient capacity to absorb demand fluctuations, and a siphon pipe that carries metal to the injection gooseneck.

An electric float indicates metal level in the gooseneck and controls it within close limits by automatically opening or closing the supply line valve. A hydraulic piston forces metal through a closed injection gooseneck into the die as in the standard hot chamber machine.

Advantages—It now becomes possible to locate the holding pot in such a manner that a wall can separate it from the casting machine. The melter can service the pot without interfering with the casting. Such a system is safer because it involves no transportation of molten metal throughout the plant.

Problem of injecting a chilled charge and having it enter the mold as a heterogeneous mass is eliminated. Gooseneck temperature and metal level vary only slightly, to insure uniform metal injection characteristics. A wide range of castings can be made with one size of piston because the injection automatically ceases when the mold is filled.

Some Shortcomings—There are some aspects of the machine that are not too favorable. Purchase price is about 50 per cent greater than a cold chamber unit of equal clamp tonnage. It is designed for high volume work and not for one-shift use. Present design is limited to 6 to 11 per cent aluminum alloys, and to finished weight castings no larger than 2 lb.



Cross section view shows arrangement of principle parts

Magnesium Association's meeting in St. Louis

seal-lined tank at between 70 and 90° F. Parts are revolved in a Lucite cylinder to achieve uniform pickle. Flash removal and satin finishing follow on a five-station indexing rotary polishing machine. Cases are machined in pairs, and this pairing is maintained throughout the rest of the processing.

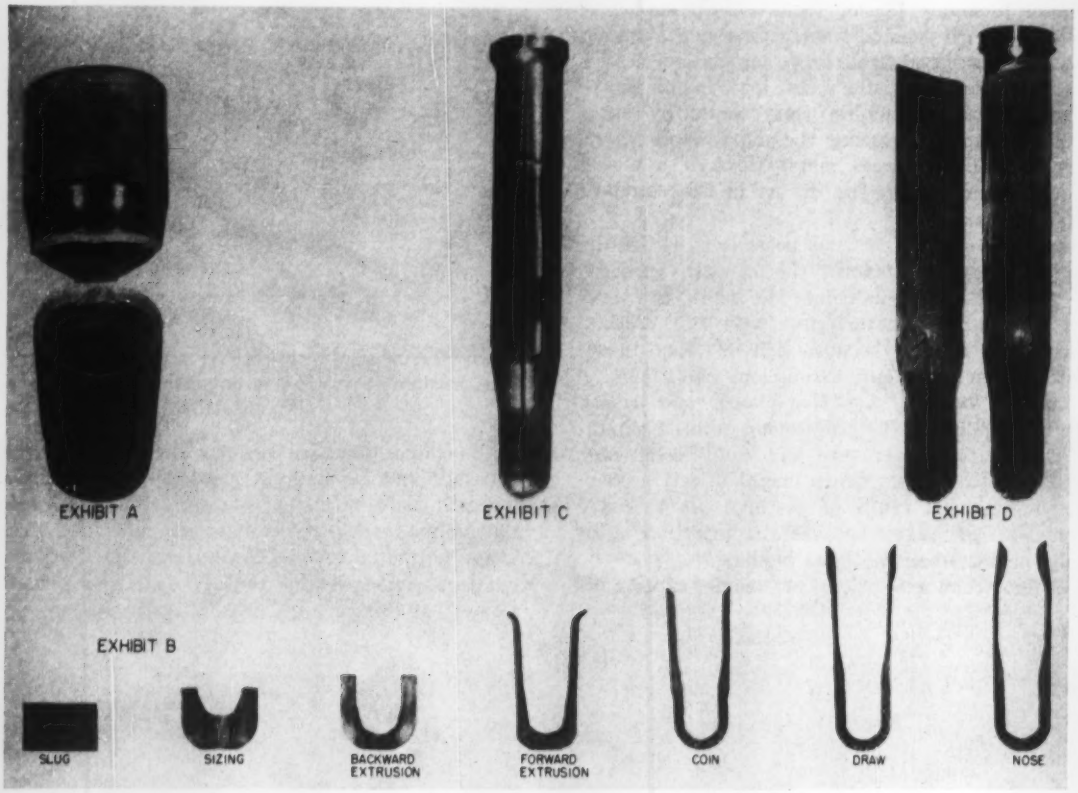
Cleaning and Activating—Parts are racked on conventional copper-bar racks, 20 complete cases to each. The plastisol coating on racks must be inspected regularly to see that no holes or looseness will carry solution from one tank to another. The subsequent zinc immersion solution has a low chromic acid tolerance.

After cleaning in an anodic bath for a period of 1 to 4 minutes, the surface is activated for the zinc immersion coating by a 20 second dip in an aqueous solution of phosphoric acid and sodium, potassium or ammonium acid fluoride.

Heart of Process—The zinc immersion coating is the critical stage. Object is to get a tightly-adhering zinc coating, at which time the process becomes similar to chrome plating of zinc castings. This is done in a solution much the same as that of the Dow process, but not quite as concentrated. Goddeyne found that they got better zinc coating, although it took longer. Bath is at 175 to 180° F with mild agitation; pH is between 10 and 10.6.

Rule cases get ground to satin finish before plating

This step is followed by a copper strike, copper plating, nickel plating and then the chrome plating. These solutions and procedures are the same as those described in Dow's magnesium finishing handbook.



The Case of the Snapping Shells

What made the cold drawing fractures that were running up scrap losses? It took a split punch after 100,000 draws to reveal the answer

By HUBERT J. PESSL
Gibson Refrigerator Co.
Greenville, Mich.

MORE THAN 1-MILLION 75-mm shells have been cold drawn at the Defense Products Division of the Gibson Refrigerator Co., Greenville, Mich. That's a lot of experience, but a mystery marred production.

Some shells would split around the circumference while being drawn. The breaks looked like tension test fractures, hinting that tensile strength was being exceeded during drawing. But why? (Exhibit A.).

Procedure — Drawing technique didn't seem at fault. The shell blank was C1018 fully aluminum killed steel. Cold forming steps were logical: 1. Size. 2. Extrude backward. 3. Extrude forward. 4. Coin. 5. Draw. 6. Nose (Exhibit B.). One anneal at 1200°F was done after backward extrusion.

The critical operation came after the anneal. At a hardness of 75 to 85 Rockwell B, the metal had to be reduced 40 per cent in cross section. Minimum required yield strength for the finished shell was 85,000 psi.

Whodunit? — Trouble was, the fractures came at irregular intervals. When a new punch was installed, they stopped for 25,000 draws, then started up again, but a tooling check showed no dimensional changes in the punch. As scrap losses approached 6 per cent, stress relief annealing of forward extruded parts was contemplated to foil breakage.

But the culprit pulled one too many. Before extra annealing could be started the punch made one final draw—and split down the middle (Exhibit C.).

The Villain—Hiding in the center of the punch was a flake, the black sheep of hydrogen occlusion or hardening stresses. Radiating from it were the typical scars of fatigue fracture (Exhibit D.).

When the two halves of the punch were fitted together, they didn't meet by ⅛-in. The punch had been growing slowly all the time, gradually cutting down the cross section of the draw, which in turn increased the percentage of failures. Failure rate might have kept right on rising if locked-in stresses hadn't busted the case wide open.

Complete valve with solenoid on top.

REVERE

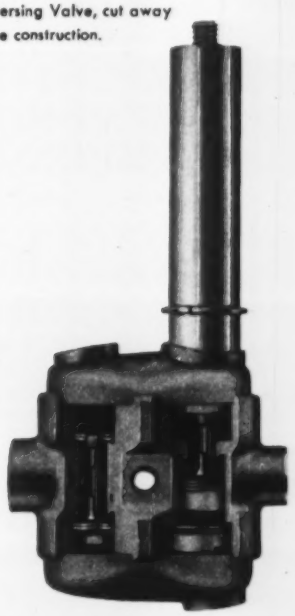
collaboration helped make this reversing valve possible

The valve shown here is unique. It is made by Ranco, Incorporated, Columbus, Ohio, and is being supplied to manufacturers of air conditioners that either cool or heat, according to the temperature. When the thermostat calls for cooling, a solenoid moves the valve to the cool position; when heat is required, the operation is reversed, automatically.

Naturally, the development of this valve took a long time. For some five years the Revere Technical Advisory Service has been collaborating closely with Ranco engineers on design and materials for control valves of various types. When the new idea was under development, Revere was called in because non-magnetic brass and copper would be required for the body. Designs were mutually studied, and it was decided to make the main portion of the body from a brass forging, which would lessen machining and provide a dense, non-porous, non-leaking part. Many thousands of these reversing valves have been shipped to makers of ½, ¾ and 1-horsepower units, without a single forging rejection. One important feature of the forging is that it makes possible silver brazing the inlet and outlet tubes so quickly that no damage is done to the synthetic valve washers. Ranco feels that the valve has a tremendous future, offering as it does completely automatic selection of heating or cooling.

When you have a new project on your boards, involving aluminum, brass or copper, we suggest you get in touch with the Revere Technical Advisory Service. Its knowledge added to yours may make your products better. See the nearest Revere Sales Office.

Ranco Reversing Valve, cut away to show the construction.



Revere Brass Forging is supplied to Ranco already machined.

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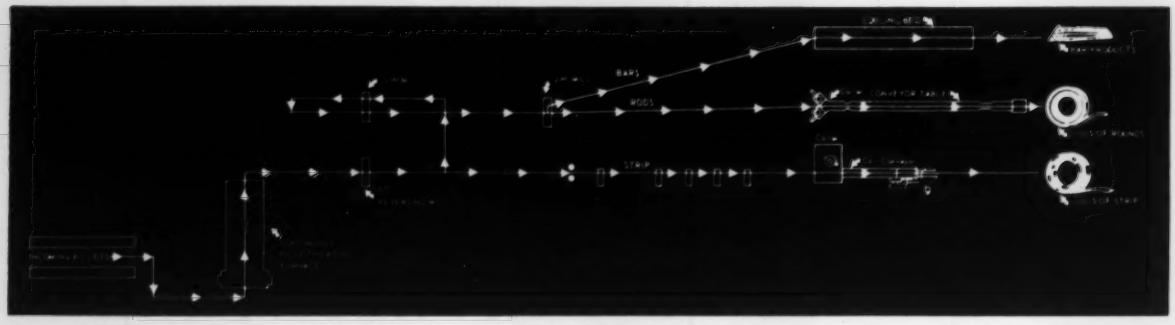


Schematic diagram shows how three products are rolled from one breakdown

Mill Pays Off in Flexibility

Transfer tables tie in a single billet breakdown mill with rod, bar or strip mills. Downtime for roll changes causes no production slowdowns

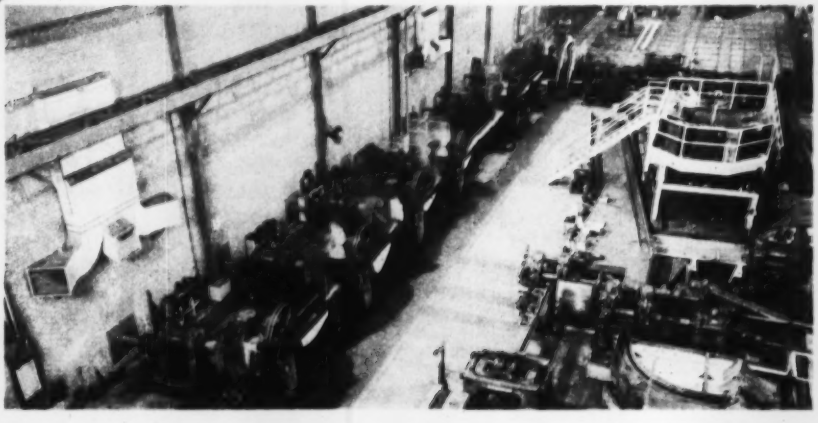
This is the 20-in. reversing mill that rolls the required shapes for each of the three finishing lines

WHEN you're in the specialty steel business—tool, stainless and alloy—like Carpenter Steel Co., Reading, Pa., flexibility of equipment is a must. And flexible is the word for their new multipurpose hot mill.

Capable of rolling strip, coiled rods and round bars, this compact 24-stand mill is just the thing for turning out the multitude of small (1000 lb and up) orders so typical of Carpenter's operation.

Three in One—The unique layout of the mill enables the company to substantially reduce downtime during roll changes. Facilities are so arranged that rolls can be changed in one part of the mill while operations continue uninterrupted on other stands.

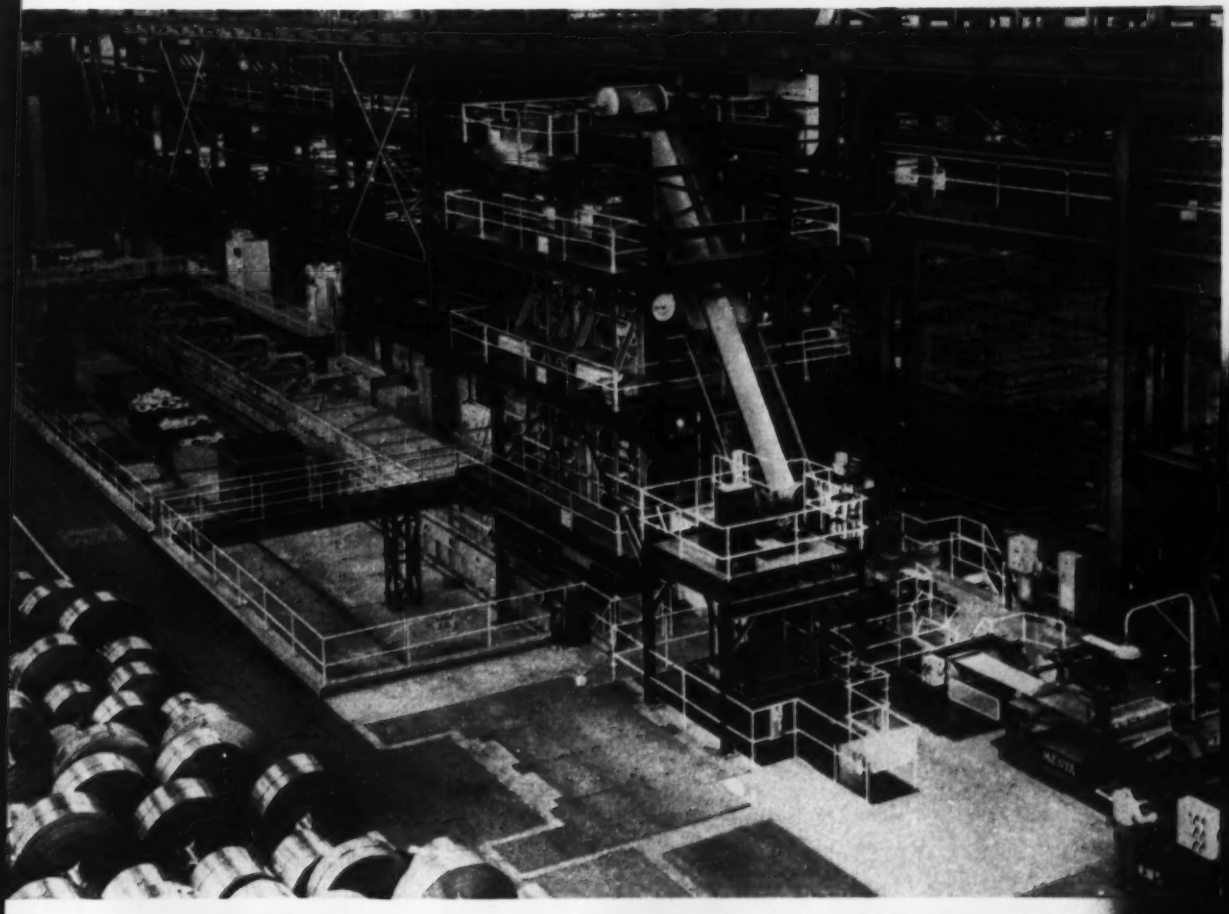
At the starting end of the mill is a continuous ingot and billet heating furnace which feeds the 20-in. reversing mill used for initial breakdown. Batch furnaces



Running along one wall of the new mill building is the five-stand strip mill. While one length goes through, the breakdown mill (background) readies another slab

Continuous galvanizing lines

Designed and Built by MESTA



Mesta 48" Continuous Galvanizing Line

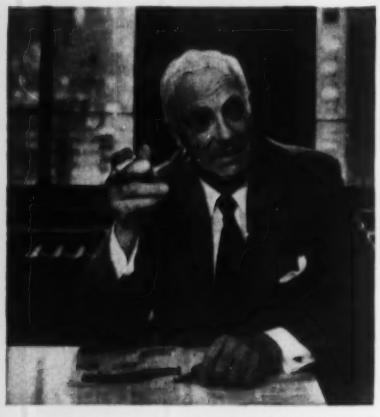
MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

(Advertisement)

How Do Lightweight Refractories Cut Fuel Costs And Boost Furnace Output?

Here, certainly, is a timely question. There's a heavy squeeze today on most furnace operators for lower costs, larger production . . . or both. And despite all the economies they've put into effect so far, they're still searching hard for ways to make their furnace dollars do a bigger job.



The following discussion brings out a number of facts, often overlooked, about the money-saving, profit-building potentials inherent in *lightweight* insulating firebrick.

Q. *First of all, just what do you mean by "lightweight" insulating firebrick?*

A. Compared with dense, fireclay brick weighing approximately 7½ to 8½ pounds each, insulating firebrick range from about 3½ pounds down to slightly over 1 pound for various temperature requirements.

Q. *What does this light weight have to do with lower production costs?*

A. Briefly, heavy furnace linings waste your fuel dollars two ways:

They soak up and store large quantities of heat which are lost when the furnace is cooled; and they conduct and lose too much heat through the wall.

Lightweight insulating firebrick, on the other hand, contain millions of tiny air cells, heat up and cool quickly, absorbing and storing very little heat. Also, they resist heat flow, keeping it inside the furnace to do productive work.

Q. *I can see why you would save on fuel — but how much?*

A. There's no single answer to that question — there are too many variables to be considered. But to give you an idea of these savings, here are a few actual examples:

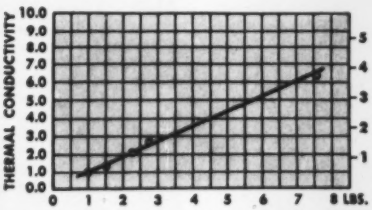
The operator of a large forge furnace cut his fuel costs more than 50% after changing to *lightweight* insulating firebrick.

A manufacturer of electric kilns states that insulating firebrick result in heat savings of fully 25%.

A magnesium melting crucible furnace that formerly used 1,000,000 BTU's per hour now does the same job with 500,000 BTU's, thanks to insulating firebrick.

Q. *Increased production has also been pointed out as an advantage of insulating firebrick. How do you explain this?*

A. Again the answer lies in lightness of weight. Because lightweight firebrick store and conduct less heat, they come up to operating temperature faster — cool down faster, too. This means — shorter heating cycles.



Relation between weight and thermal conductivity for several brands of kaolin base refractories. (mean temperature, 900F)

Secondly, because lightweight firebrick conduct far less heat than heavy, dense firebrick, you don't have to build as thick a wall. This gives you more hearth area per square foot of floor space.

Thirdly, lightweight firebrick respond more rapidly to changes in furnace heat input, which means closer temperature control and fewer rejects in many instances.

It's just like adding extra furnace capacity without adding to your furnace investment.

Q. *Are there any differences in the performance of the various brands of insulating firebrick available?*

A. Naturally, the *lighter* the brick the greater the fuel savings and furnace output. And the lightest insulating firebrick of all, for any temperature range — if you'll pardon our mentioning it — are B&W Insulating Firebrick.

THE BABCOCK & WILCOX CO.
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General Offices:
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Works: Augusta, Ga. R-508

Progress . . .

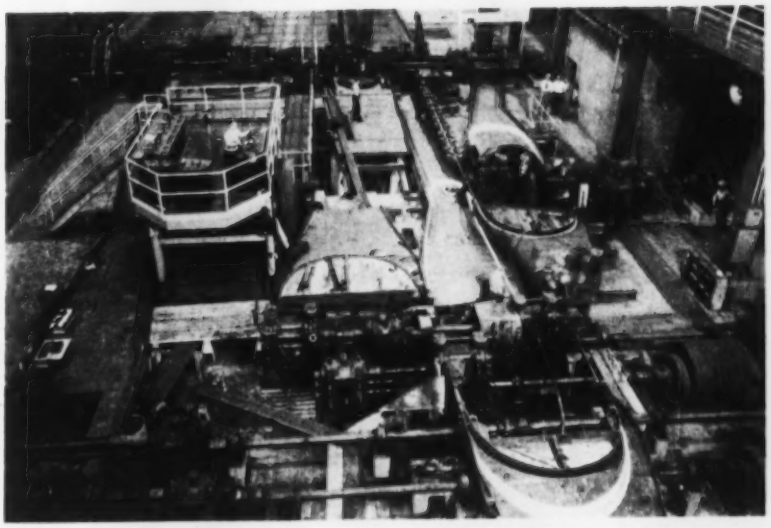
are also used for heatup of some of the specialty steels. After the prescribed breakdown, semi-finished steel moves either directly into the strip mill or is transferred into entry position for the bar or rod mills.

Size Ranges — Costing $7-million, the mill construction commenced in late 1951, and the seven-stand, 14-in. strip mill rolled its first coil in 1953. Strip sizes range from ½ to 10 in. wide, with a minimum thickness of 0.093 in.

But it wasn't until recently that the rest of the installation was completed. Now the mill is operating at capacity (3500 tons per month) in all size ranges. This means coils of rods from ¼ to 13/16 in. and round bars from ⅜ to 1½ in. in diameter. The latter are rolled in five 12-in. stands and rods in ten 10-in. stands. The reversing mill can cog ingots up to 14 in. square.

They're Happy—Aside from giving them the desired flexibility and stepped-up order handling, Carpenter reports quality improvement, too. Automatic oil-fired furnaces aid in controlling surface decarburization. Closer tolerances are maintained, thanks to the continuous movement through the mill and end thrust adjusting devices on mill stands.

All bars are individually cooled on notched bar cooling beds which makes for uniform grain structure. Coils, both strip and rods, are also cooled individually on conveyors. Better control of temperature from billet to finished product results in closer end-to-end tolerance and better uniformity in ultimate structure.



Rod and bar mills work side by side with the strip mill (off at left). Note how loops are closely controlled in small area, permitting compactness in design of the installation

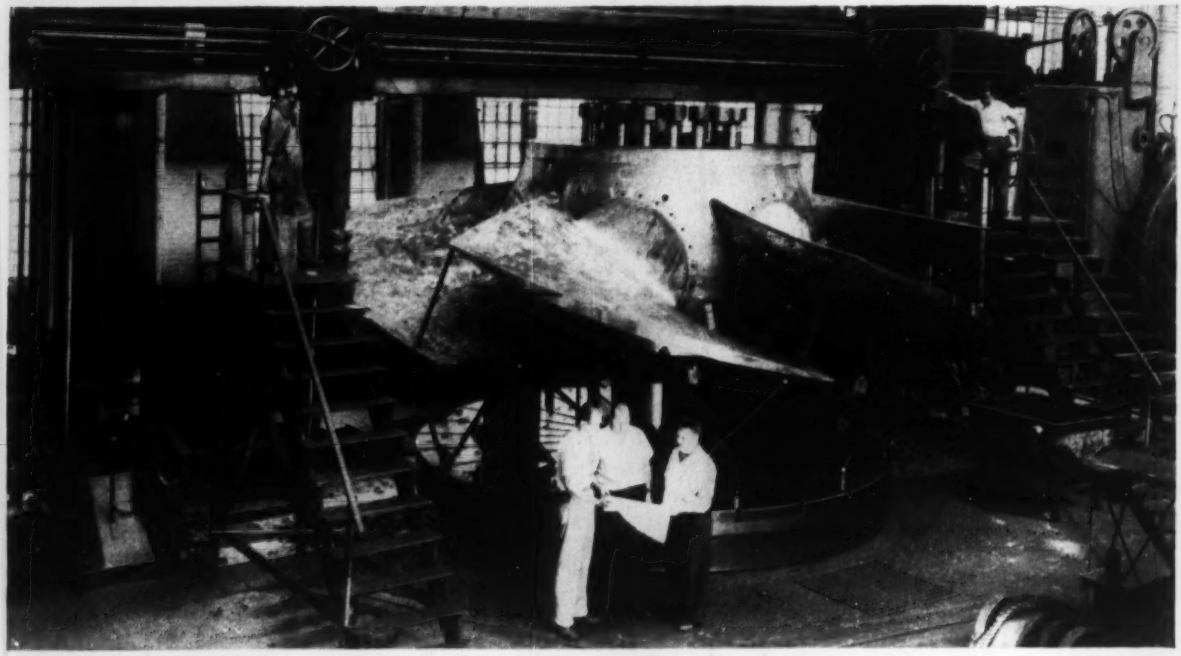
Overall shot shows the various finishing points. Strip coiler is at left, rod coiler in the center and notched bar cooling bed at right

Two-way radio telephones are used for both operating and maintenance efficiency. Note asphalt tile floor in the motor room. This innovation makes cleaning easy

(Advertisement)

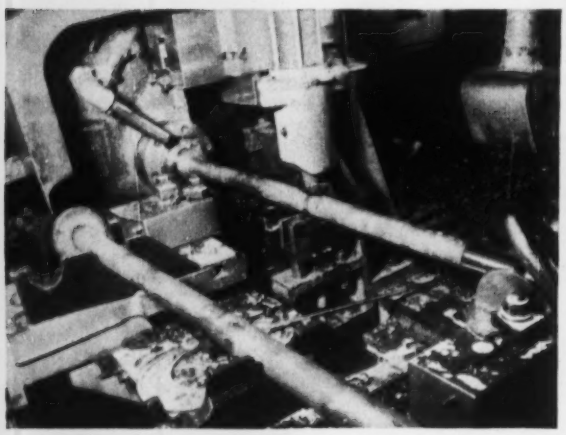
From on-the-job reports

PRODUCTION INCREASES UP TO 30%



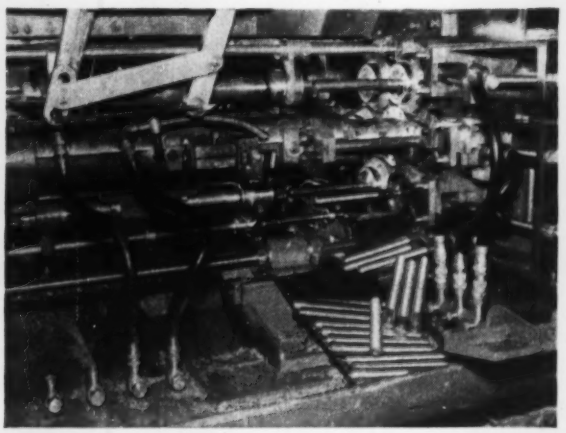
PROPELLER RUNNER. Grade 370 cut machining of tip contours on 165-ton runner from 220 to 65 hours. Carbide takes interrupted cuts through heavy scale at 3 times former speed, with 88% less downtime.

SETUP: Material—Welded high-tensile carbon steel (A 148-50 T, GR 80-50). **Speed**—154 SFPM. **Feed**—1/32 inch. **Depth of cut**—7/16 inch. **Coolant**—No.



TRUCK AXLE FORGING. Turning with Grade 350 resulted in 33% more pieces per tool. Chipping and flaking, encountered with previously used tools, were eliminated.

SETUP: Material—AISI 4150 steel forging. **Speed**—200 SFPM on 2-inch diameter; 400 SFPM on 4-inch diameter. **Feed**—0.014 inch. **Depth of cut**—1/16 to 1/8 inch. **Coolant**—Yes.



THREADED LEVELING SCREWS. Carboloy Grade 370 tools, used in 6-spindle Cone Automatic, boosted production to 944 screws per hour, compared to 140 with steel tools.

SETUP: Material—SAE B1112 one-inch diameter steel screw stock. **Speed**—1586 RPM for threading. **Feed**—0.005 inch for chamfering and cutoff. **Coolant**—Yes.

WITH NEW CARBOLOY® SERIES 300 STEEL-CUTTING CARBIDES

Case histories prove Grades 350 and 370 outperform, outlast other carbides on tough steel-cutting jobs.

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Bonded Aircraft Panels

New metal adhesives push studies on adhesive bonding of aircraft structures

DEVELOPMENT of high strength metal-to-metal adhesives has made possible an entirely different approach to fabrication of metal aircraft. Advantages offered by the substitution of adhesives for rivets in the fabrication of structural components have already been realized by several aircraft companies.

Widespread adoption of this method in the future has become a definite possibility according to the National Bureau of Standards. To secure better understanding of the behavior of adhesive bonded aircraft structures the bureau has conducted investigations under sponsorship of the National Advisory Committee for Aeronautics and Navy Bureau of Aeronautics.

Development—Use of adhesives for bonding aircraft structural components is not new. During World War I, casein was used to glue wooden aircraft. Synthetic glues were used extensively for all-wood and some wood-metal joints for aircraft in World War II.

Finally, development of high strength resin and resin-rubber adhesives made possible bonding of all-metal aircraft structural components. Two such are the sandwich panel and the sheet-stringer panel.

Bonded Panels — A sandwich panel consists of three laminations bonded together. The outer two are made of strong, stiff, sheet materials which usually determine elastic and strength properties. The core is of light material. It separates the facings and restrains them from becoming elastically unstable.

Value of sandwich construction lies in light weight and high bending strength and stiffness. Also desirable from the aerodynamic standpoint is the absence of rivet heads.

One application of sandwich construction is in skins and floors for pressurized fuselages where construction is subjected to lateral pressures and axial loads si-

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"doodles" or complete plans?

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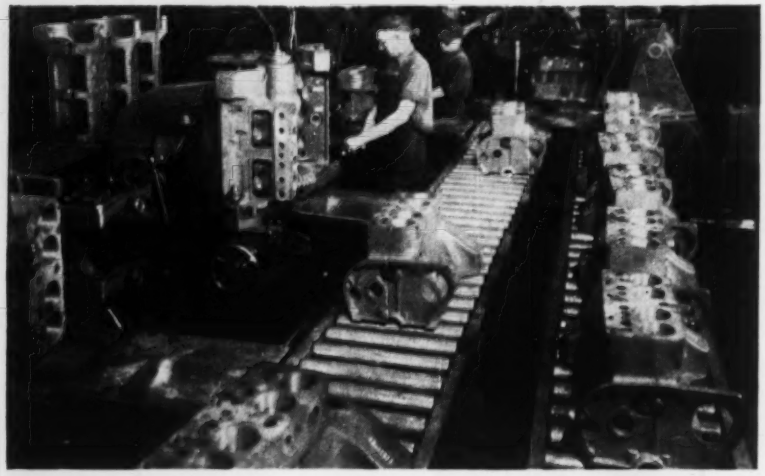

Many a complex conveying problem has been solved by Standard engineers with only a customer's "doodle" drawing to follow. And often when complete plans are submitted, Standard engineers make recommendations that improve the conveyor application . . . save time and money as well.

If you prefer to do your own conveyor planning, we suggest you send for Bulletin 63-D. Here in 28 fast-reading pages you get all the specifications, drawing and application data on a wide range of Standard Conveyors. This includes gravity and power conveyors and accessory equipment: Handidrive pre-built conveyor units and the complete, self-contained portable conveyor units listed below.

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multaneously. The bureau has investigated the strength of sandwich panels under these combined loads.

Sheet-Stringer — A more conventional type of aircraft structure to which adhesives have been applied is the sheet-stringer panel. This construction, which comprises most of the outer skin of a conventional airplane, consists of a sheet with stiffeners attached longitudinally to one side. The sheet provides the aerodynamic contour while the stiffeners add strength, stiffness and stability.

Stringers often are angles or channels, but frequently have cross-sections resembling Z's, I's or hats. In the past, stringers were almost always riveted to the sheets. Innovations are the bonded sheet-stringer panel and the integrally machined sheet-stringer panel.

Test Results—The bureau tested twenty-one riveted and bonded sheet-stringer panels for the NACA to determine relative merits of these two types.

Results obtained show that mechanical properties of both types of panels are comparable. Choice would depend upon the specific designs being compared.

Comparison — The primary advantage of bonded sheet-stringer panels over conventional panels which have one line of rivets per stringer is the increased sheet stability obtained by bonding. Broad area of attachment between sheet and stringers reduces the unsupported width of sheet, increasing the load necessary to produce buckling between stringers. Stress concentrations near the rivet heads which tend to produce buckling between stringers are eliminated.

Primary disadvantage of bonded sheet-stringer panels seems to be mode of failure in flat end compression. When maximum load was reached in the tests, bonded panels experienced almost complete destruction. Failure of riveted panels, on the other hand, was confined to local buckling of sheet and stringers between rivets.

Acceptance — Important factor restricting acceptance of adhesive bonding for aircraft structures is the difficulty of inspecting bonded joints. Small changes in pressure,

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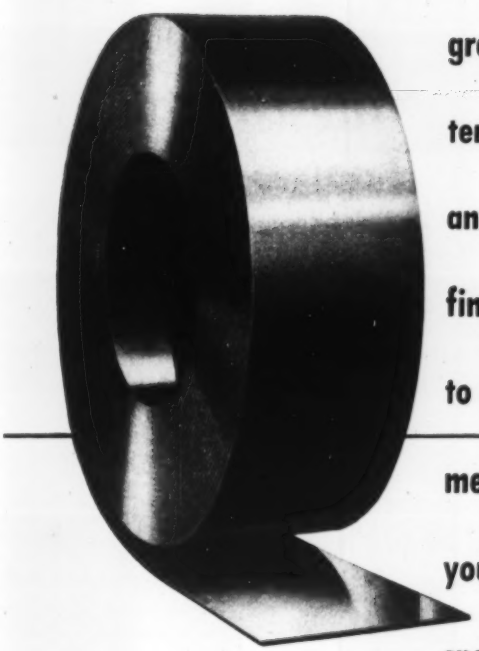

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DoALL band machine sawing slots which were formerly milled. Part is held in simple fixture on hydraulic power feed table. Note coolant flow.

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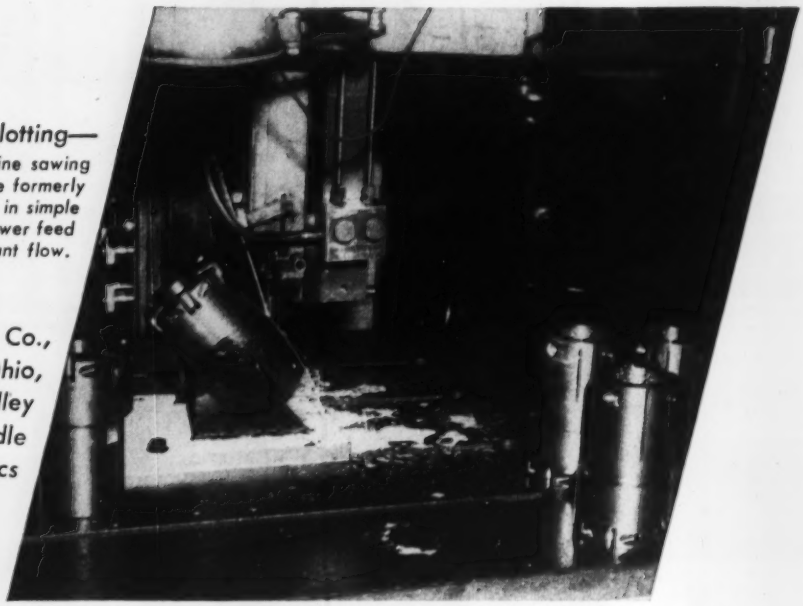
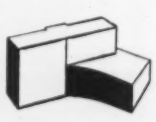
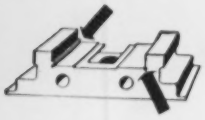


How Band Machining cuts costs on 600 Parts for a Machine Tool Builder

TYPICAL PRODUCTION BAND MACHINING WORK AT NATIONAL ACME

Cutting Parts from Solid—this assures longer-wearing parts at approximately the same cost as using castings or forgings!





Cutting Grinding Relief

Cutting Contoured Parts

Slotting and Splitting operations

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At National Acme Co., Cleveland, more than 600 production operations formerly done with milling machines, planers, shapers, torches and lathes are now done at ⅓ to ½ the cost with DoALL band machines.

You can achieve similar savings by utilizing the new concept known as "non-restricted geometry" on production operations such as those illustrated at the left. Here is why:

Faster Cutting — band machining is the fastest method of removing sections of metal.

Less Set-up Time — because of simple fixturing.

Lower Cost Fixtures — often a simple clamp is all that is needed.

Lower Cost Cutting Tool — DoALL saw bands do more work per tool dollar and there are no resharpening costs.

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The best way to visualize the concept of production band machining is to see it in action. Ask to have a demonstration truck at your plant. Call your local DoALL Service-Store, or write: ***The DoALL Company, Des Plaines, Illinois.***

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PB-4

temperature, humidity, in fabricating can greatly decrease strength of the joint, and can often be detected only by destructive tests.

These imperfections can be dangerous in modern high-speed aircraft which are designed with extremely high operating stresses. Important in widespread application of bonding techniques is the development of completely reliable fabrication or satisfactory nondestructive inspection.

Reverse Drawing

REVERSE draw process is a method in which the sides of the can are rolled back and forth with each succeeding draw, like turning a stocking inside out. With each succeeding draw the diameter is reduced and the length increased.

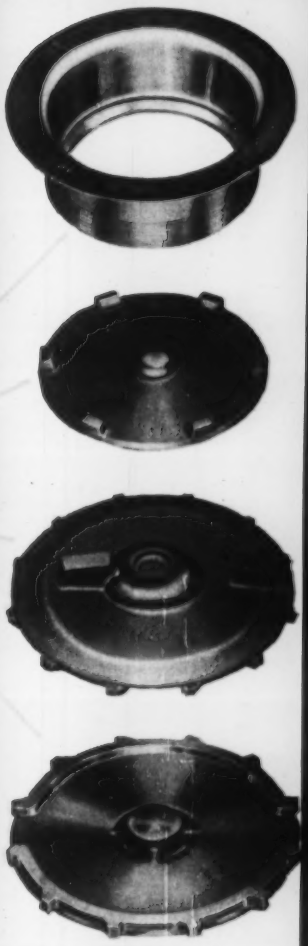
For runs of about 200 or less, Minneapolis Honeywell Regulator Co. finds the reverse draw process for cylindrical cans the most economical. Tooling, on a Dension Multipress, is simple and costs between 15 and 25 per cent of the cost of conventional draw dies. Tooling is made of mild steel and includes two riser blocks, two draw ring plates, two hollow cylindrical drawing punches and one solid drawing punch.

FOR CYLINDRICAL CANS
. . . simple tooling means economy

Operating Cycle—In the cycle of operation the blank is placed on the lower draw ring and centered. The top draw ring is placed over the blank and bolted down. This is centered under the ram of the press and the first draw die placed

MUELLER BRASS CO. forgings* contribute to the efficiency of this modern waste disposal unit

***MUELLER BRASS CO. facilities include:**
designing, die-making, forging, tooling, machining, polishing, plating and assembly



Three Mueller Brass Co. forgings play an important part in the fine operating performance of this modern waste disposal unit made by the Eureka-Williams Co., Division of the Henney Motor Co., Inc. This unit does a speedy and thoroughly effective job of pulverizing garbage and has made life easier for American housewives. The impeller disposer that chops up the waste food in the disposal unit, the disposer cover and the sink mounting flange are all forged by the Mueller Brass Co. This is another outstanding instance where Mueller Brass Co. forgings have improved product performance and cut costs. High quality forgings can be produced from standard and special brass, bronze and aluminum alloys. And in addition, the Mueller Brass Co. offers complete service ranging from product design to finished part . . . Write today for complete information and new 32 page forgings handbook.

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2. Machined and finished disposer cover forging.
3. Cutting side of impeller disposer forged from 600 series bearing bronze.
4. Reverse side of impeller disposer.

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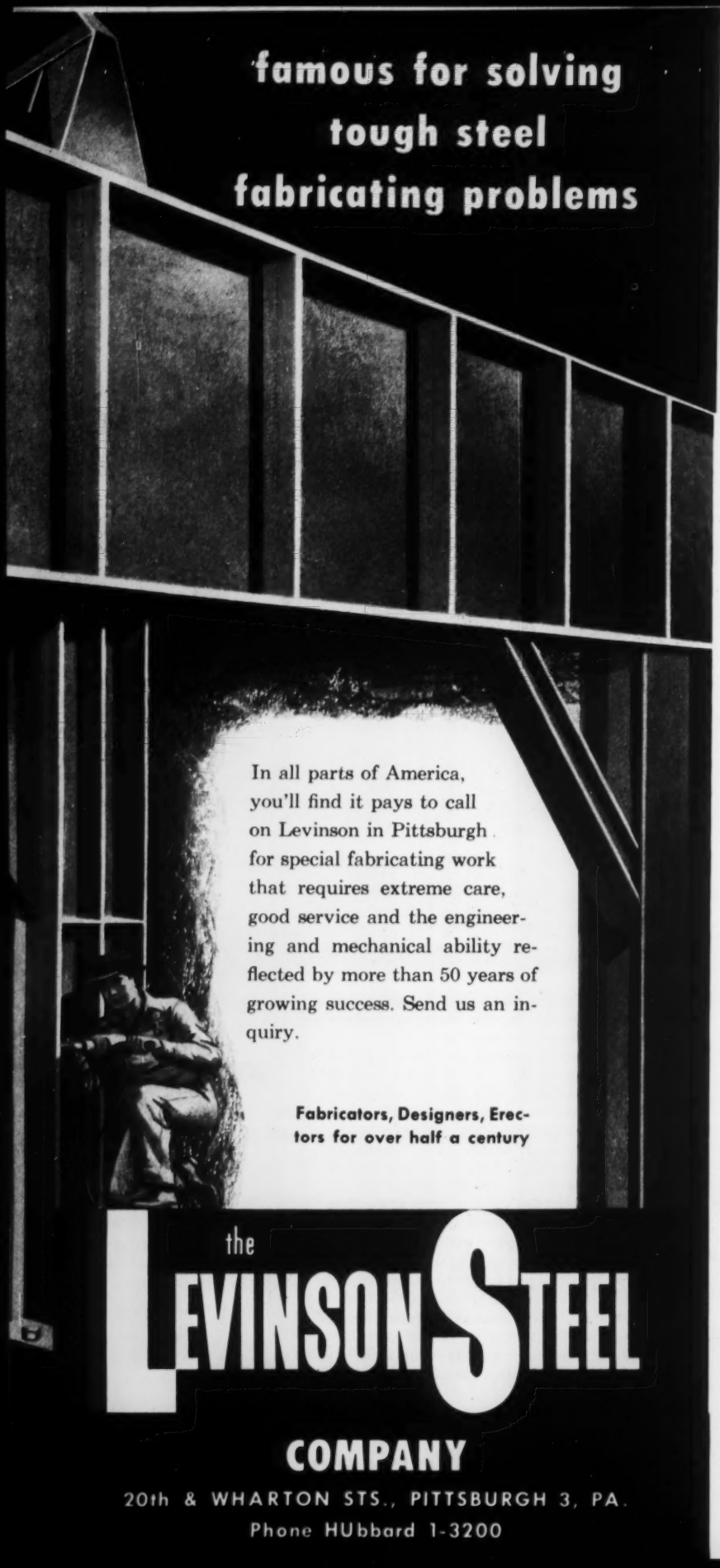
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into the top draw ring. The ram comes down and forms the first draw.

After the draw is completed, the part clings to the hollow punch. The punch and part assembly is inverted 180 degrees and the draw rings removed. The second punch is placed on top of the drawn part still covering the first punch. As the ram is brought down, the part is turned inside out. The sides of the can move up the first punch and down over the second punch until the first punch is stripped of the part. Then the second punch is inverted 180 degrees and the third punch is placed on top as was done in the previous draw. The third and final draw is made and the part stripped from the punch.

Additional Draws—This type of operation has only been performed on 2-SO aluminum. There have been cases where five draws were possible without annealing. Generally, annealing is required after three draws, but M-H expects at least one additional draw over conventional crank press methods before annealing, due to close pressure and speed control.

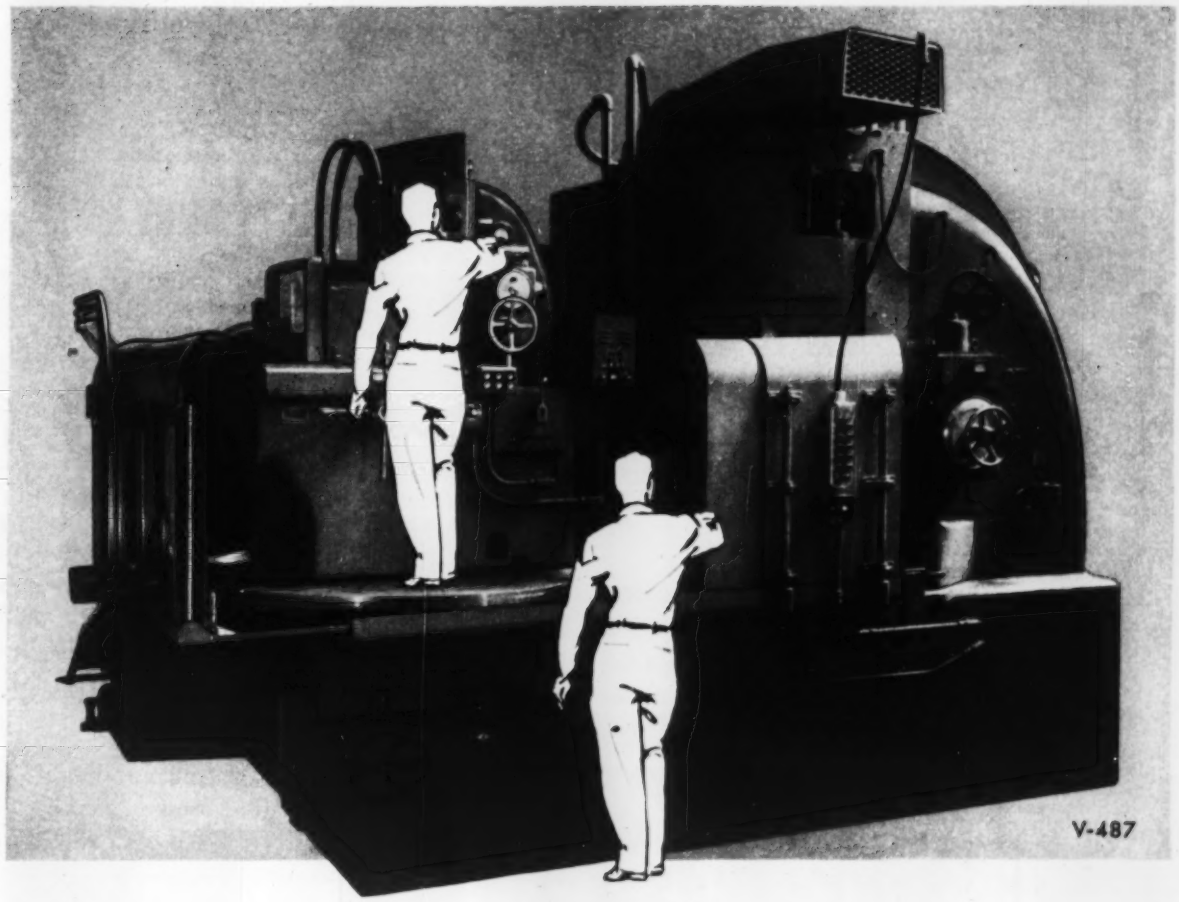
AC Machines

Beginning with transformers, "Alternating Current Machines" is intended to show you how to understand, test, predict and calculate the behavior and performance of the most important classes of alternating current power machinery.

This third revised edition, written by A. F. Puchstein, T. C. Lloyd and A. G. Conrad, offers complete treatment of machine reactions based on modern practice. Although rigorous in the treatment of machine reactions, the book is filled with expressive, self-identifying terms, notations and symbols.

A set of up-to-date problems is incorporated in the 713-page text to test your understanding of the theoretical applications.

Among the subjects covered are: Loading polyphase transformers; adjustable speed drives, short-circuit characteristics of alternators and rectifiers. Published by John Wiley & Sons Inc., New York, price is $8.50 per copy.



WE PUT ONE BLANCHARD ON ANOTHER

. . . to show you the wide range of sizes!

It's true! There's no "trick" photography involved. Our 5,400-lb. No. 11 Blanchard Surface Grinder fits snugly on the 84" chuck of our giant 61,000-lb. No. 42-84. And, like all Blanchards, both have chucks flat within .0002" – guaranteed!

Do every surface grinding job in your shop *perfectly* . . . whether you grind tiny watch parts – steel plates 7 feet across corners – or anything in between . . . *put it on a Blanchard.*

Whatever your requirements for stock removal, tolerances or surface finish, ask for details on the 15 standard Blanchard models today. One of them will fill your needs perfectly and will do your work with speed and precision – at costs which help you set competitive prices.

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".

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THE BLANCHARD MACHINE COMPANY **64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.**

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Another First for
KRANE KAR
A SILENT HOIST
EXCLUSIVE!

Ask about the New Lease-a-KRANE KAR-Plan . . . 1 to 3 Year Lease with Option to Purchase.

Silent Hoist gave you ***KRANE KAR,*** the first modern Mobile Crane . . . Front-Wheel Drive . . . Stability without Stabilizers . . . Lifetime Front Axle . . . Automatic Safety Controls. And now *Silent Hoist* gives you **FLUID DRIVE!**

- Increases engine clutch life.
- Provides cushioned starting and acceleration.
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Ask for Bulletin No. 79C

"Silent Hoist" *KRANE KAR* Swing-Boom Mobile Crane . . . 1½, 2½, 5, 10, 12½ Ton Capacities

SILENT HOIST & CRANE CO.
Pioneer Mfrs. of Heavy Duty Materials Handling Equipment
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SAVE with STERLINGS

You profit two ways with easy-wheeling Sterling Barrows. (1) You save muscle power because Sterlings glide along with a minimum of effort. (2) You save dollars because Sterlings are made to outlast any barrow on the market . . . give you many additional years of service. Compare costs with other barrows. You'll find Sterlings actually cost less per year.

SAVE MUSCLE POWER
Balanced construction puts 80% of the load on the wheel . . . only 20% on the operator.

SAVE DOLLARS
Sterlings pay off in PROFITS. Their unusually long service life protects your initial investment. And maintenance costs are nil.

STERLING C5W
Maximum capacity 5 cu. ft. 16 gauge tray, all-welded, no rivets, double lapped at corners. Heavy-duty malleable wheel guard.

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Ask about our liberal dealer selling plan. Write for catalog.

Costs Less per Year

Look for this Mark of STERLING Quality

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

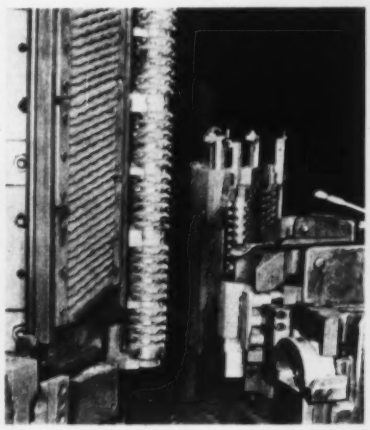
Sterling WHEELBARROWS

A 7638-¼

Increasing Broach Life

CEMENTED carbide-tipped broaches not only increased bearing cap broach life at Studebaker Corp., South Bend, Ind., by 2500 per cent, it reduced overall costs. Studebaker engineers say the shift shaved overall costs — tooling, downtime, labor, etc. — approximately 22 per cent on first run.

Broaching automobile bearing caps, like most broaching operations, is tough on tools. The job is further complicated by the work



BROACHING BEARING CAPS
. . . broach life up 2500 per cent

material, highly-abrasive cast iron with a sandy surface condition. Required is a broach having a high enough abrasion resistance to combat the sandy surfaces.

Machine Setup—Work is done on a Cincinnati vertical broaching machine with 2 rams. Speed is 28 sfm, chip load per tooth 0.005 in. for roughing and 0.0015 for finishing.

Special round, push-type three-section broaches are employed on the standard machine set-up. Each broach section has 12 teeth, and in operation only half the diameter contacts the part. Thus, two settings of the broach are made before removing for resharpening.

Performance—The former broach operated a maximum 24 hours, and sometimes failed completely after 1½ hours. Maximum production was 3600 parts. After tipping with Carboloy grade 883 cemented carbide, the initial broach ran 50 days on continuous production on 12-hour operating cycle, producing 90,000 parts on one setting without any service needed. Subsequent runs have consistently exceeded initial performance.

Republic Aviation operates P&H high-frequency welders as standard metallic arc welders, also, so that duplicate equipment does not have to be purchased.

More than doubles welding speed with P&H

30 P&H TH-200 high-frequency machines make inert gas arc welding 2½ to 3 times faster than former gas welding at Republic Aviation Corporation

No replacement maintenance in three and a half years of two-shift operation

You don't have to take our word for the outstanding performance record of P&H Welders. The following statements are actual quotes from a certified report issued by the H. P. Gould Co. of Chicago, who made an impartial study of welding operations at Republic Aviation Corporation, Farmingdale, L. I., N. Y.

"In the building of faster and better aircraft, new developments in welding have played an important part and P&H high-frequency inert gas welding has proved that it can solve the problems of welding aluminum alloys.

"Three and a half years ago, Republic Aviation tested P&H TH-200 HF Inert Gas AC Arc Welders, and evaluated them against the existing equipment in the plant, as well as against outside competition.

"P&H welders of four different types are now used in four locations in the plant, for the welding of hundreds of different parts. In general, they are welding aluminum alloys from .032" thickness up to .250", and heat-resisting alloys from .010" up to a thickness of .093". For arc-welding alloy steels (4130, 4140, 8630, 8740, etc.), experience has proved P&H electrode AW-4 most satisfactory, and it is used exclusively.

"Republic Aviation welding engineers back up the claim of the makers that P&H welders require very little maintenance. The 30 high-frequency arc welders have had no replacement maintenance whatever in three and a half years of two-shift operation — and the operating cost of each P&H TH-200 HF Welder is only 40¢ per day."

Like Republic Aviation, whose studies show P&H inert gas arc welding to be 2½ to 3 times as fast as former gas welding you, too, can enjoy the money-saving advantages of P&H Arc Welders with Dial-lectric Control. You, too, can get faster, better welds at lower cost.

We've given you the Republic Aviation story in a nutshell! You can get all the detailed facts and figures by reading Gould Report No. 5311. Write for your copy today.

P&H WELDING DIVISION

HARNISCHFEGER CORPORATION

4411 WEST NATIONAL AVE. • MILWAUKEE 46, WIS.

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TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · ELECTRIC HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

P&H welding equipment is manufactured and sold in Canada by REGENT EQUIPMENT MANUFACTURING COMPANY LTD.
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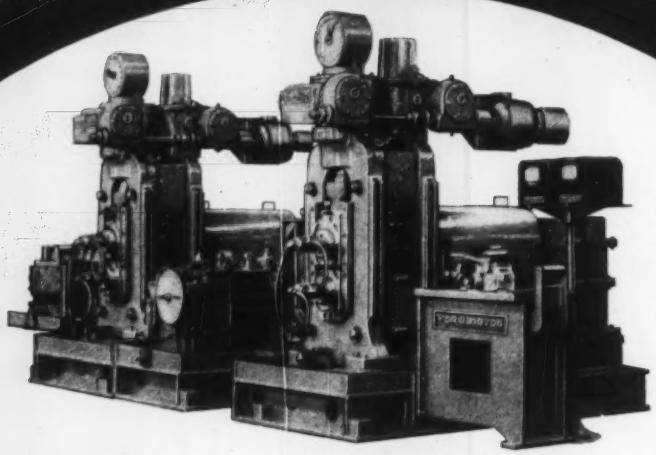
YOU CAN LOWER WIRE ROLLING COSTS



...with a Torrington Flat Wire Mill

SPEEDED PRODUCTION — Torrington Flat Wire Mills achieve finishing speeds up to 3500 FPM.

GREATER ACCURACY — Processed wire can be held to tolerances of .00025″ in thickness and .0005″ in width. Automatic magnetic gauges eliminate waste.

FLEXIBILITY — Combination of two or three flattening stands, with edgers, can accommodate wide variety of work.

DEPENDABILITY — Torrington machines are ruggedly built for years of repair-free service. Easy access to flattening rolls and other major components greatly reduces downtime for maintenance, adjustment and threading.

COMPLETE ENGINEERING SERVICE — Auxiliary mill machinery should be selected only after thorough consultation with experienced engineers. Torrington's engineering staff, backed by the knowledge and skill gained while serving the metal mills for nearly 70 years, will work with you to provide machinery best fitted to your needs. For full information, call or write: Mill Machinery Division, Torrington Manufacturing Company, Torrington, Conn.

THE
TORRINGTON
MANUFACTURING COMPANY
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Make Small Parts Handling Work for You

THE RULE-OF-THUMB that the best handling is the least handling can be re-emphasized when small parts are in process.

Ideally, the system should incorporate a container capable of receiving, moving, storing and positioning parts for subsequent assembly or for packaging and shipping—all without imtermediate rehandling.

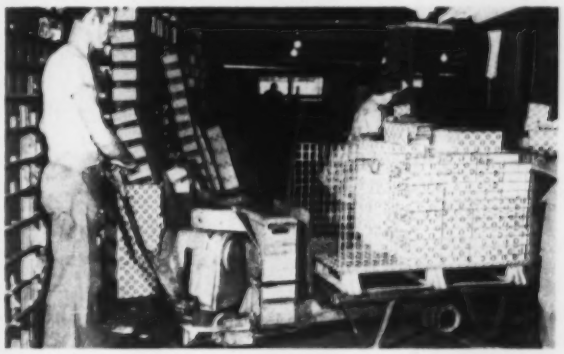
Shop to Storage to Shipping — Pictured are important points in the setup developed by Union Malleable Mfg. Co., Ashland, O., to get its output of pipe fittings from machine shop to storage to shipping. The company's problems are multiplied by plant location and space: They have only 80,400 sq ft of floor space, and storage and shipping are something like a mile away from production facilities.

Fittings are packaged directly from machine shop parts trays. Boxes then are loaded into steel mesh containers for a quick trip by truck to the shipping department. Placed in storage, the loaded Cargotainers can be stacked three high. Open fronts make it easy to fill orders directly from storage.

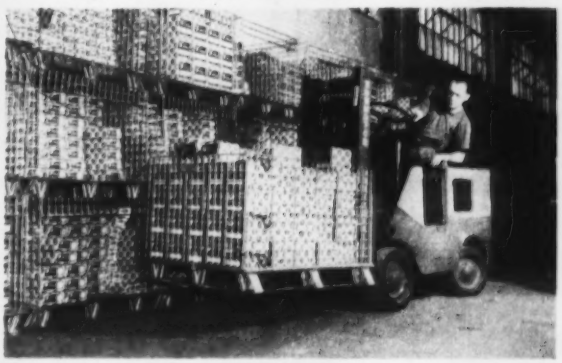
Reduces Manpower—The system is quite an improvement. Its predecessor called for tossing finished castings from parts pans into burlap bags, loading the bags onto skids and trucking the loads to shipping. There they were dumped and packaged. Besides all the rehandling, there was a serious storage problem brought on by the cramped quarters.

Union Malleable estimates a $6 saving on every ton shipped since use of the Pittsburgh Steel Products Co. containers. Even though its output has gone up about 25 per cent over the period, they've still cut the shipping force from 28 to 20 men.

Pipe fittings are taken from parts trays and packed in boxes before being placed in containers for transfer



An electric walkie truck carries container with run of fittings from packing table to loading dock



A mile away at the shipping department, the Cargotainer loaded with packaged parts is fork-lifted into storage

Containers have 6-ton capacity, can be stacked easily to get the most out of Union Malleable's small storage space

Orders are filled directly from the containers. Open mesh and front end provide easy inventory and withdrawal

All types of INDUSTRIAL Anaconda's 7 mills and net

BUILDING WIRE

Rubber insulated (Types R, RH, RH-RW, RW) for general purpose power and lighting.

Thermoplastic insulated (Type TW) with high resistance to moisture, corrosive fumes and chemicals.

DUTRAX* Type NM nonmetallic-sheathed cable for open or concealed wiring.

DURALL-T† Type UF and NMC cable for open or concealed wiring, inside or outside masonry block or tile walls, or underground feeder, subject to moisture, fumes, etc.

POWER CABLE

Interlocked Armor—quick, easy, inexpensive to install. Easily relocated. Light, flexible.

DURASHEATH† all-purpose neoprene-jacketed cable can be run in the ground, in ducts, overhead in one *continuous run* without splices. Durasheath is also widely used as building wire.

DENSHEATH* for general power uses. PVC insulated. Resistant to flame, moisture, chemicals.

Varnished-cambric insulated for power, lighting and control uses.

Paper-lead for power in moderate and large blocks. 69,000 volts maximum rating.

CONTROL CABLE

Supplied with PVC (DENSHEATH), polyethylene, rubber, and varnished-cambric insulation.

BUS DROP CABLE

POWERDUCT flexible cable increases use and mobility of machines; Underwriters' approved with rubber insulation and loom cover. Can be furnished with PVC jacket, flame-, moisture- and chemical-resistant.

PORTABLE CORDS

SECURITYFLEX† cord, 2/c to 6/c with special stranding and tough neoprene jacket. Takes abuse, won't kink, flexes indefinitely.

MACHINE TOOL WIRE

DENSHEATH PVC insulation, stranded conductors — flexible, easily worked, and will stand up against oils, greases, cutting compounds, abrasion.

SWITCHBOARD CABLE

Solid conductor with super-aging DENSHEATH PVC insulation.

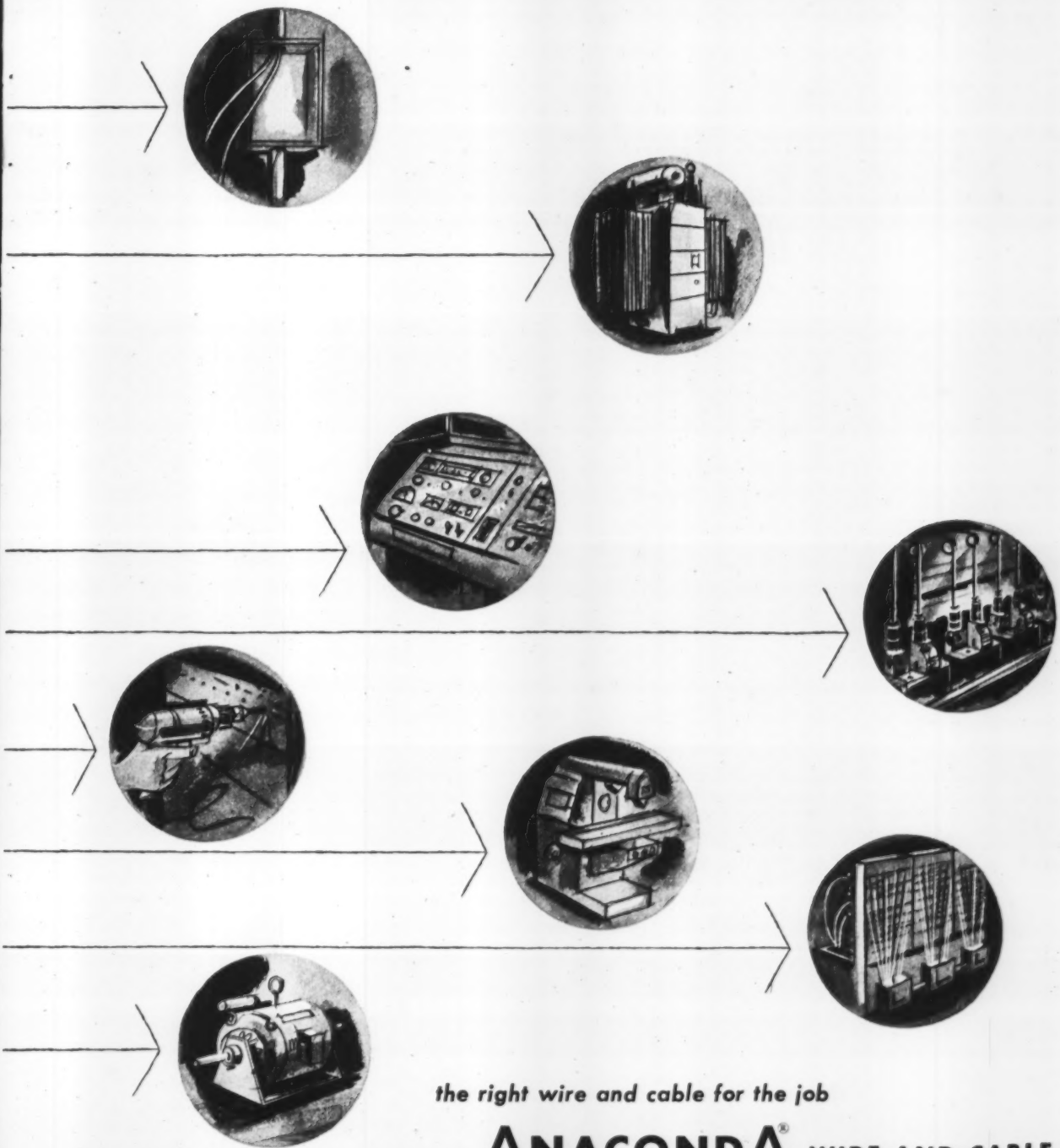
MAGNET WIRE

Anaconda produces a complete line of magnet wire . . . all types, sizes and shapes. Round, square, rectangular. CLASS A: *Formvar, Enamel, Nyform, Nylon.* CLASS B: *Vitrotex*, Silicone.* CLASS H: *Silotex*.*

*Reg. U. S. Pat. Off. †Trade Mark 54396

For more information call your nearest Anaconda Sales Office. ***Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.***

WIRE and CABLE from work of wholesale outlets



the right wire and cable for the job

ANACONDA® WIRE AND CABLE

Townsend Saves Manufacturer $4.12 Per Thousand Pieces On This Part

A Midwest appliance manufacturer has improved his line of electric sweepers and at the same time reduced unit costs by having this part made by the Townsend method. Before a Townsend engineer suggested this change, the part was machined from bar stock. The process was slow and considerable metal was wasted as scrap with the result that it cost $4.12 per thousand pieces more than this Townsend cold-formed part.

Cold-forming is a fast, accurate method of mass producing quality parts and fasteners. Its economy stems from the combination of speed and elimination of wasted metal. The extra quality comes from the increased strength gained by cold forging and the fact that Townsend draws its own wire to assure close size accuracy and excellent surface finish.

The versatility of the Townsend method also gives you design advantages that permit eccentric shapes, wings and offsets to be formed when the piece is upset or extruded. It may then be drilled, flattened, slotted, knurled, threaded, pointed, punched, bent, trimmed or machined.

Townsend makes parts and fasteners in carbon, alloy and stainless steels —in brass, bronze, copper, and aluminum—in a variety of platings and finishes.

As "The Fastening Authority," Townsend is known in all industry as a dependable source of quality fasteners and parts. It has the capacity to produce 60-million pieces daily—makes more than 10,000 standard and special items which are used to fasten metal, plastics, wood, fabrics and glass together quickly, economically, permanently. To learn more about the economy of the Townsend method, write for Bulletin TL-89 or use the coupon below.

THE FASTENING AUTHORITY

Townsend

COMPANY • ESTABLISHED 1816

Sales Offices in Principal Cities

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

TOWNSEND COMPANY
Sales Department
New Brighton, Pa.

Please send without obligation "Special Cold-Formed Fasteners and Small Parts" Bulletin TL-89.

Name_____ Title_____

Company_____

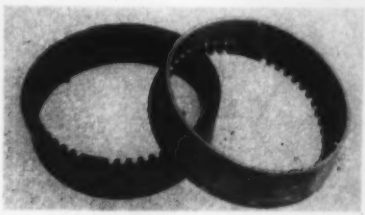
Street_____

City_____ Zone_____ State_____

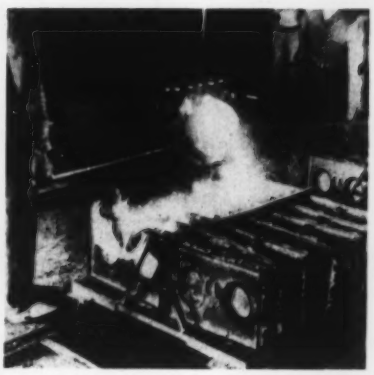
Shell Molds Save

SAVINGS AMOUNTING to about 67 cents per shredder ring for a garbage disposal unit result from casting the rings to closer tolerances in shell molds.

A thin layer of sand particles bonded firmly in place by Bakelite phenolic resins produces the lightweight, porous molds. Cast from stainless steel by Cooper Alloy Corp., Hillside, N. J., the rings go into a unit produced by Westinghouse Electric Corp.



SHREDDER RINGS
. . . no machining now



POURING RINGS
. . . many molds in little space

Closer tolerances in the castings have permitted elimination of all machining operations. Gases from the molten steel escape through the porous mold eliminating surface imperfections and resulting in a high percentage of sound castings.

Shell molds require less storage and production floor space, and lend themselves to flexible, mechanized foundry operation.

Cutting Tool Maintenance

To present, in pictures and nontechnical language, the various factors that contribute to good milling practice, the Milling Cutter Division of the Metal Cutting

Tool Institute offers "How To Use and Care for Milling Cutters." Means and methods of setting up, operating and maintaining the cutters for the best possible results are suggested.

To help you get the most out of your gear cutting tools, the Gear Generating Tools Sub-Division offers "How To Use and Maintain Gear Cutting Tools." Each basic type of tool is covered. Variations in the basic type of tool and why these variations are important are described.

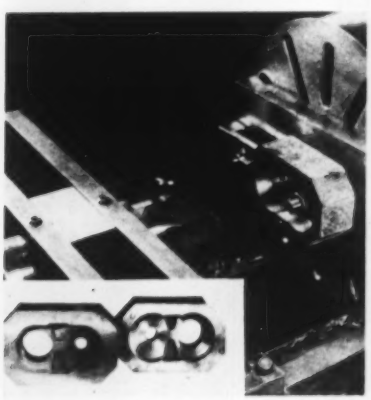
For copies, write to the respective divisions in care of the institute, Chrysler Bldg., 405 Lexington Ave., New York 17. The pamphlets are $1.00 each.

Simplified Boring

Tooling averages 1400 pieces machined between blade resharpenings

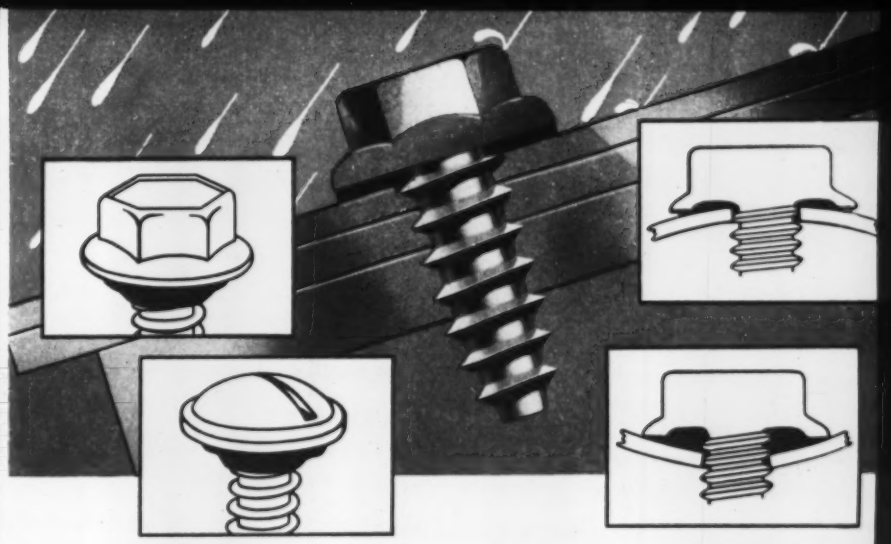
A SPECIAL boring bar, using a wedged-in tungsten carbide milling blade, is being used by Energy Farm Equipment Co. for boring and facing counterbore of cast iron hydraulic pump parts in one pass.

This operation consists of boring two holes of 2.503 to 2.506-in.



WEDGED-IN BLADE
. . . free from brazing strain

diameter by 0.878 to 0.879-in. deep and facing the bottom of the bore with a 7/8-in. width of cut. Depth of cut is 1/8 to 3/16 in. on both bottom and side of bore. The workpiece—a back pump casting—is clamped to the face plate of a 14-in. LeBlond engine lathe run



New *Tuff-Tite** Fastener Prevents Leaks—Protects Surface—Absorbs Shock—Stops Squeaks

Tuff-Tite is a new multi-purpose fastener with a one-piece metal head and assembled neoprene washer that gives you quick, secure, economical, leakproof fastening of metals and plastics.

Use of Townsend's Tuff-Tite makes possible watertight fastening of galvanized steel, protected metal, stainless steel, aluminum, plastic and other roofing and siding materials at substantial savings over conventional fasteners.

Leaks between the head of the screw and the metal washer are impossible because they are made as one piece. When this fastener is tightened, the pre-assembled neoprene washer is trapped and controlled by an undercut in the washer head. The neoprene is forced into the hole and around the threads to form a watertight and airtight seal.

Tuff-Tite fasteners provide surface protection in assembly of appliances and similar products. The neoprene washer provides a cushion that permits tight seating without cracking or chipping porcelain enamel and other fine finishes.

Where vibration noise is a problem in automobiles, railroad passenger cars and machinery, the cast neoprene washer on Tuff-Tite fasteners acts as a shock absorber—eliminates squeaks and chatter.

Tuff-Tite fasteners are available as self-tapping screws, thread cutting screws, drive screws, machine screws, stove bolts, wood screws, nails and special products. They are made of carbon, alloy and stainless steel, aluminum, copper and other metals in a variety of head styles.

To learn more about how Tuff-Tite can increase your fastening efficiency—improve your products, use the coupon below or write.

*Trademark

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COMPANY • ESTABLISHED 1816

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TOWNSEND COMPANY
Sales Department
New Brighton, Pa.

Please send to me without obligation "Tuff-Tite" Bulletin TL-97.

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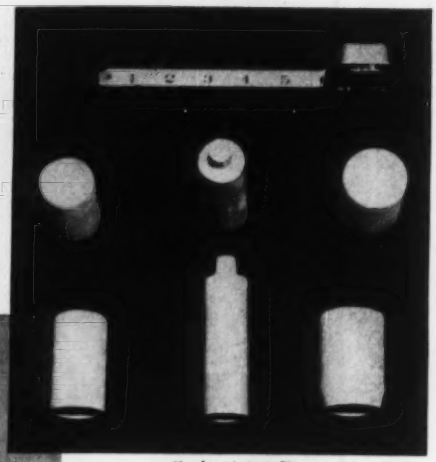
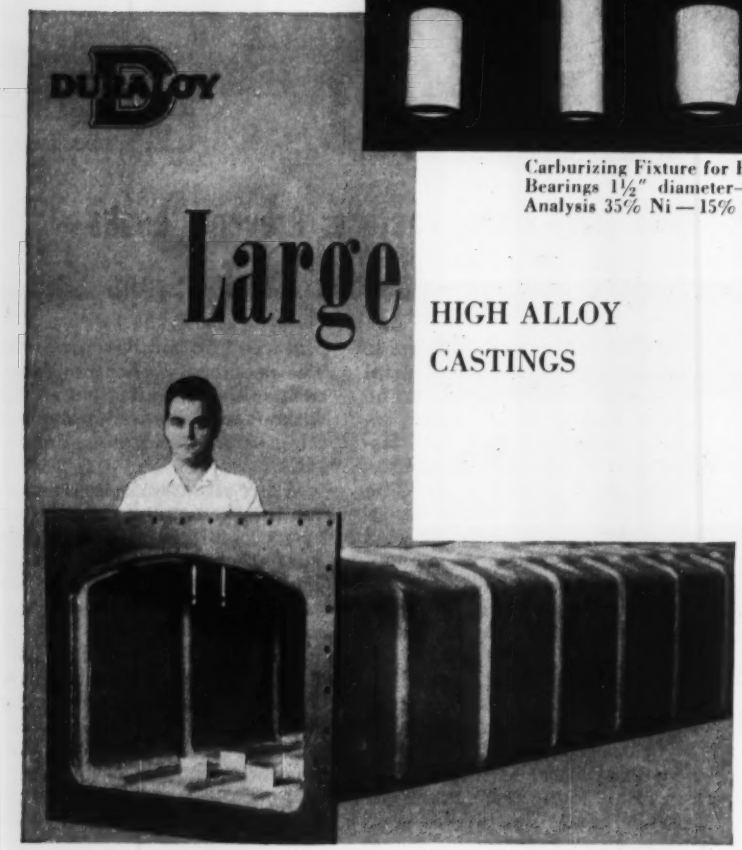
Small

HIGH ALLOY CASTINGS



Carburizing Fixture for Ball Bearings 1½" diameter—Analysis 35% Ni — 15% Cr



Large

HIGH ALLOY CASTINGS

Muffle for Continuous Strip Annealing 12' 6" long — Analysis 38% Ni — 18% Cr.

LARGE or small DURALOY, can do it! These are just typical examples of the work moving through our foundry. Some of these castings are designed for heat resistance, some for corrosion resistance, some for abrasion resistance; all are cast by experienced foundrymen. All are carefully tested in our up-to-date laboratory.

If you have a high alloy casting problem . . . LARGE or small, we can help you. For more information, send for Bulletin No. 3150-G.

THE DURALOY COMPANY

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at 0.010-in. feed per revolution, 140 rpm on the bore, and 57 rpm for facing the bottom of the bore.

Size and Finish—The Monticello, Iowa, manufacturer of hydraulically-operated farm equipment reports excellent success with this tooling. It provides part size and finish well within requirements, with an average of 1400 pieces machined between blade resharpenings.

Total life of their Kennametal solid blade is about 15,000 pieces. Since the price of the blade used is $7.80 each, blade cost per piece machined is 52 cents per 1000 pieces.

The wedged-in blade—modified only as to cutting edge and relief angles—is free from any brazing strain. Regrinding is performed by removing the blade from the holder and clamping it in a special grinding block designed to present the blade to the grinding wheel at the required angles.

Machining Troubles End

MACHINING cast iron with a cast iron grade of cemented carbide sometimes doesn't work. When faced with such a problem, one answer is to try a steel grade. That's what Warner & Swasey did, and production jumped from 18 to 40 pieces per grind.

The Cleveland company's headache was machining heavily-scaled Crusco iron used for turret lathe stator frames. The metal was extremely abrasive, producing a chip similar to that obtained from cutting steel.

Success — After trying several cast iron grades of carbide tools on the job unsuccessfully, the company shifted to a steel cutting grade—370 carbide, developed recently by GE's Carboloy department for heavy-duty steel cutting.

Tool life immediately increased 122 per cent. In addition, machine downtime was reduced better than 66 per cent.

The job consisted of turning and facing the work with a semistandard ¾ x 1¼-in. tool with a 45-degree lead angle. The operation was run on a W & S turret lathe at 250 sfm with a 0.012 feed and 5/16-in. depth of cut.

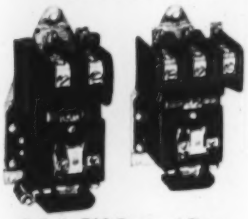
PRECISION LIMIT SWITCHES

SPECIAL CONTROL PANEL

OILTIGHT PUSH BUTTON STATIONS

Quality MOTOR CONTROLS for Automatic Machines

Bulletin 709
Solenoid Size 3 Starter



Bulletin 702 Two and Three
Pole Size 1 Contactors

Bulletin 350 Drum Switch
for Flush Mounting

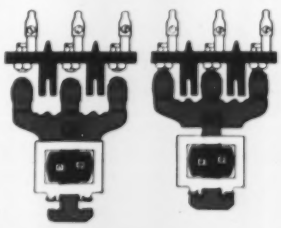
Bulletin 800T Oiltight
Selector Switch

When you sell your machines fully equipped with automatic motor controls, make these controls a featured sales asset. Standardize on a line . . . like ALLEN-BRADLEY . . . having a world-wide reputation for QUALITY . . . and you can guarantee "complete" customer satisfaction.

Independent industry-wide surveys list ALLEN-BRADLEY controls at TOP preference among machinery users. In test after test ALLEN-BRADLEY motor controls are the first choice of designers, shopmen, and electricians. They like the simple A-B design and trouble free operation. They like the fine A-B appearance. They like the big line of A-B accessory controls that solve so many control problems so easily. They like the all around A-B "Quality."

We shall be glad to send you the Allen-Bradley Handy Catalog. Please write for your copy, today.

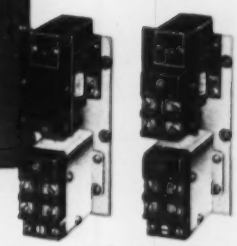
The reason for the trouble free performance of Allen-Bradley solenoid starters is the simplicity of design. There is but ONE MOVING PART . . . the ONE PIECE solenoid plunger which carries the double break moving contacts (shown in red).



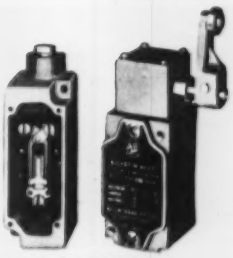
SIMPLE—
Only One Moving Part

The double break fixed contacts are mounted in the molded contact block (shown in black).

The cadmium silver moving and stationary contacts need no filing, cleaning, or dressing. They are good for millions of switching operations.



Bulletin 849 Pneumatic Timer
Adjustable—1/6 to
180 Seconds



Bulletin 801-802T
Limit Switches

Bulletin 700 Universal A-C
4-Pole Relay

Bulletin 892 Terminal Blocks
for Special Control Wiring

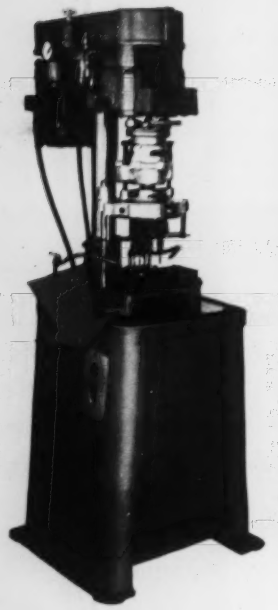
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Limited—Galt, Ont.

ALLEN-BRADLEY

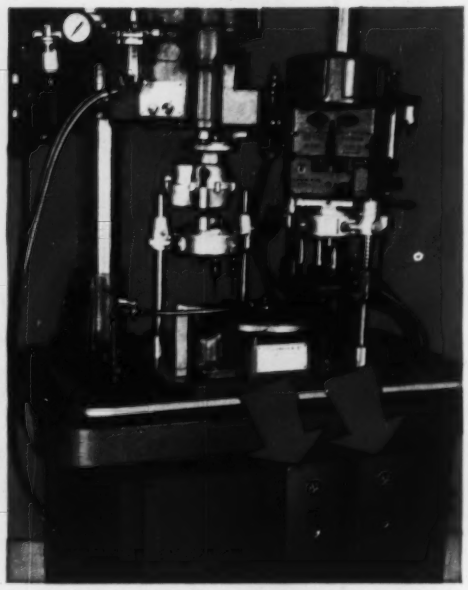
TROUBLE FREE MOTOR CONTROLS

QUALITY

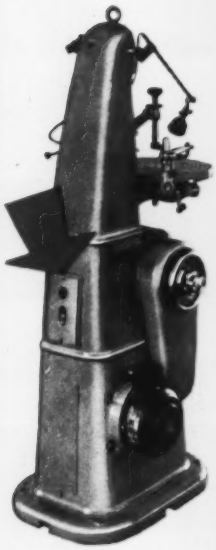
9-54-R



Ettco single spindle tapping machine with manual flush starter.



Ettco multiple spindle drilling and tapping machine with two Allen-Bradley Bulletin 609 manual flush type motor starters.

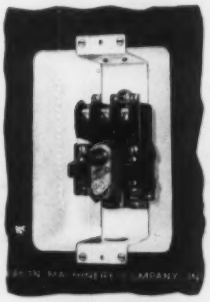


Williams punch and die making machine with A-B flush type starter.

Improve the appearance of your machines with A-B flush type motor starters

When contemplating the design of a new machine, take advantage of the opportunity to "streamline" your design by recessing into the base of the machine at least the starter—and perhaps this can also be done with the motor.

Look at the trim appearance of the three motorized machines shown above. Note how the designers have provided recessed cavities for flush type Allen-Bradley Bulletin 609 manual motor starters.



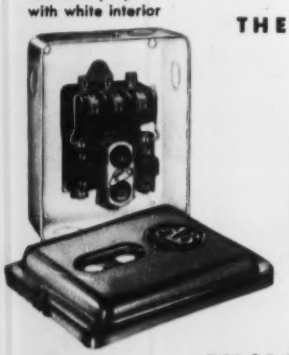
Bulletin 609 manual starter in machine base

These flush type motor starters give a smooth, modern appearance to the machines and, therefore, provide a "sales value" that can be used to advantage.

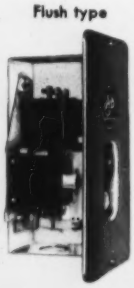
Allen-Bradley Bulletin 609 manual starters, Bulletin 709 automatic starters, and Bulletin 712-713 combination starters can be furnished in several types of flush mountings. They are fully described in the Allen-Bradley Handy Catalog. Send for a copy, today.

THE LINE OF BULLETIN 609 MANUAL STARTERS

General purpose with white interior



Flush type



Weatherproof & waterproof

Explosion proof

Single phase

ENCLOSURES FOR EVERY OPERATING CONDITION

9-54-R

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. In Canada—Allen-Bradley Canada Limited—Galt, Ont.

ALLEN-BRADLEY

BULLETIN 609 MANUAL STARTERS

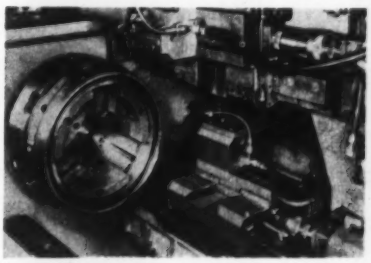
Lathes Speed Tank Part

Five automatic lathes make an efficient machining line for a husky turning job

PRODUCTION TURNING of heavy duty tank transmission parts at a plant of one of the major automotive companies is being speeded by an automatic lathe line. Five Model HD-24 automatic lathes built by Hydra-Feed Machine Tool Corp., Ferndale, Mich., were tooled up to perform the series of turning operations.

Parts are turned from rolled and welded SAE 8740 rings. All cuts are at approximately 360-420 sfm. For first three roughing operations, the lathes are equipped with 50 hp motors; 30 hp motors are used for finish turning. In addition to top and rear carriages that are a distinctive feature of the lathes, final lathe in the line mounts a tool on a platen for counterboring.

No Lost Motion—For the first turning operation, two carbide tools mounted on the top carriage



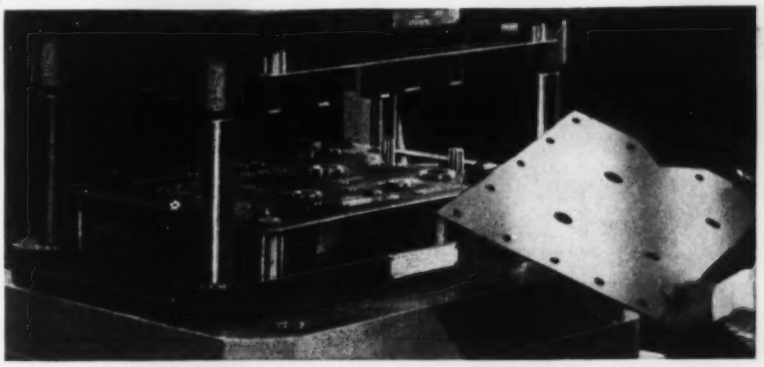
DOUBLED-UP TOOLING
. . . ups machining efficiency

rough bore the inside diameter of the ring. At the same time, two more tools on the rear carriage face and counterbore one side of the ring. All tools have rapid advance.

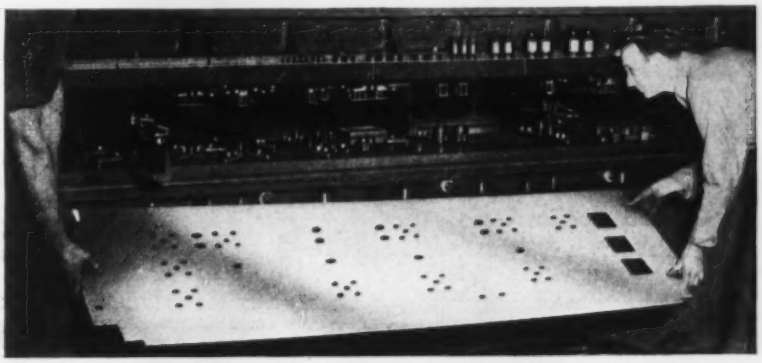
At lathe No. 2, the ring is turned over and clamped internally to turn the O.D. and face and counterbore the second side. A single tool is used in the top carriage; two are mounted in the rear carriage.

Chews Up Metal—In the third operation the ring is again turned over and a 1-in. wide by 2¼-in. deep groove cut at 0.015 feed using a ⅝-in. tool on the rear car-

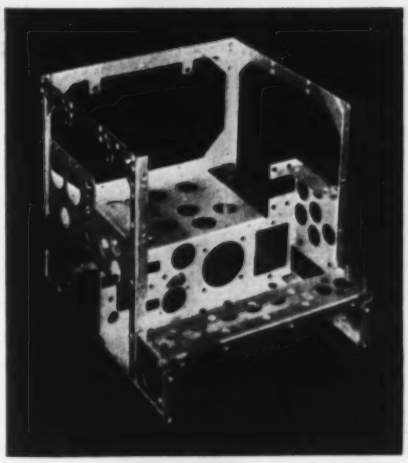
OVER 2,000 PLANTS *are making up their Metal Perforating Die Sets by Whistler methods*



WHISTLER MAGNETIC PERFORATING DIES



WHISTLER ADJUSTABLE PERFORATING DIES



- Lower die-making costs.
- Start production quicker.
- Save work handling labor.
- Increase press production.
- Versatile in job application.
- Perforate materials to ¼" thick mild steel.
- Combine horizontal and vertical perforating operations.
- Work in practically any size or type of press.
- All parts re-usable and interchangeable.
- Precision assured on short or long runs.
- Parts interchangeable right in the press.
- Magnetic dies assembled on templates.
- Adjustable dies assembled on Tee slot die sets.
- Save floor and storage space.
- Die investment not "tied up."

SEE FOR YOURSELF *Without Obligation*

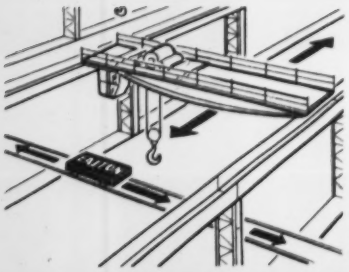
Our *illustrated* Catalogs show the simplicity, economy and versatility of Whistler methods. See for yourself why Whistler customers are the biggest names in industry.

WHISTLER DIES ARE CUTTING COSTS FROM COAST TO COAST

S. B. WHISTLER & SONS, INC.
742 Military Road **Buffalo 23, New York**

Cross-Bay Transfer

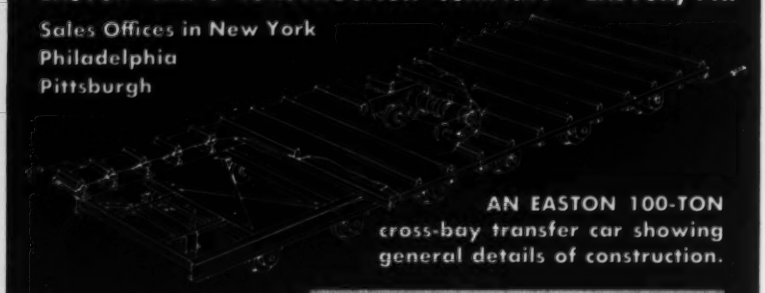
TRADE MARK



The EASTON motorized cross-bay transfer car is designed to provide lateral handling of materials to supplement overhead crane service in modern multiple bay plants. The cross-bay movement of the automatic transfer car provides a universal handling system able to spot a load anywhere on the floor of the plant. The same car system may also be used for moving materials between plant buildings.

EASTON CAR & CONSTRUCTION COMPANY · EASTON, PA.

Sales Offices in New York
Philadelphia
Pittsburgh



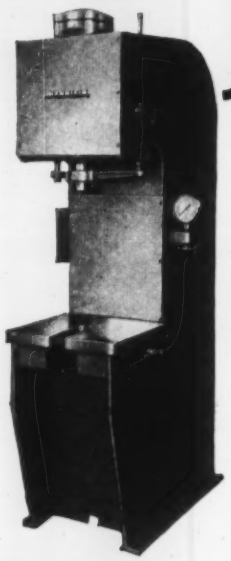
AN EASTON 100-TON cross-bay transfer car showing general details of construction.

EASTON®

A-1046

PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES



1-TON	$ 552
2-TON	$ 627
5-TON	$1,286
8-TON	$1,581
10-TON	$1,855
25-TON	$3,681

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

HANNIFIN

HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

riage and a ½-in. tool on the top carriage.

Both carriages feed longitudinally at the same time with the ½-in. tool leading. Cycle time is approximately 3 minutes as compared with about 20 minutes formerly required on an earlier setup.

Final Steps—Finish turning begins on the fourth machine where the top carriage finish bores the inside diameter and finish turns a step on the outside of the groove. Rear carriage uses two tools to finish face two surfaces on one side of the ring.

In the final operation a platen tool is used to counterbore inside diameter of the groove while top carriage tools finish turn the O.D. and the tool on the rear carriage finish turns the groove. This again uses the longitudinally feeding rear carriage.

Parts have a finished diameter of 21.500 in. Because the lathes are unobstructed by tools at the front, loading is simplified and shorter floor to floor time results.

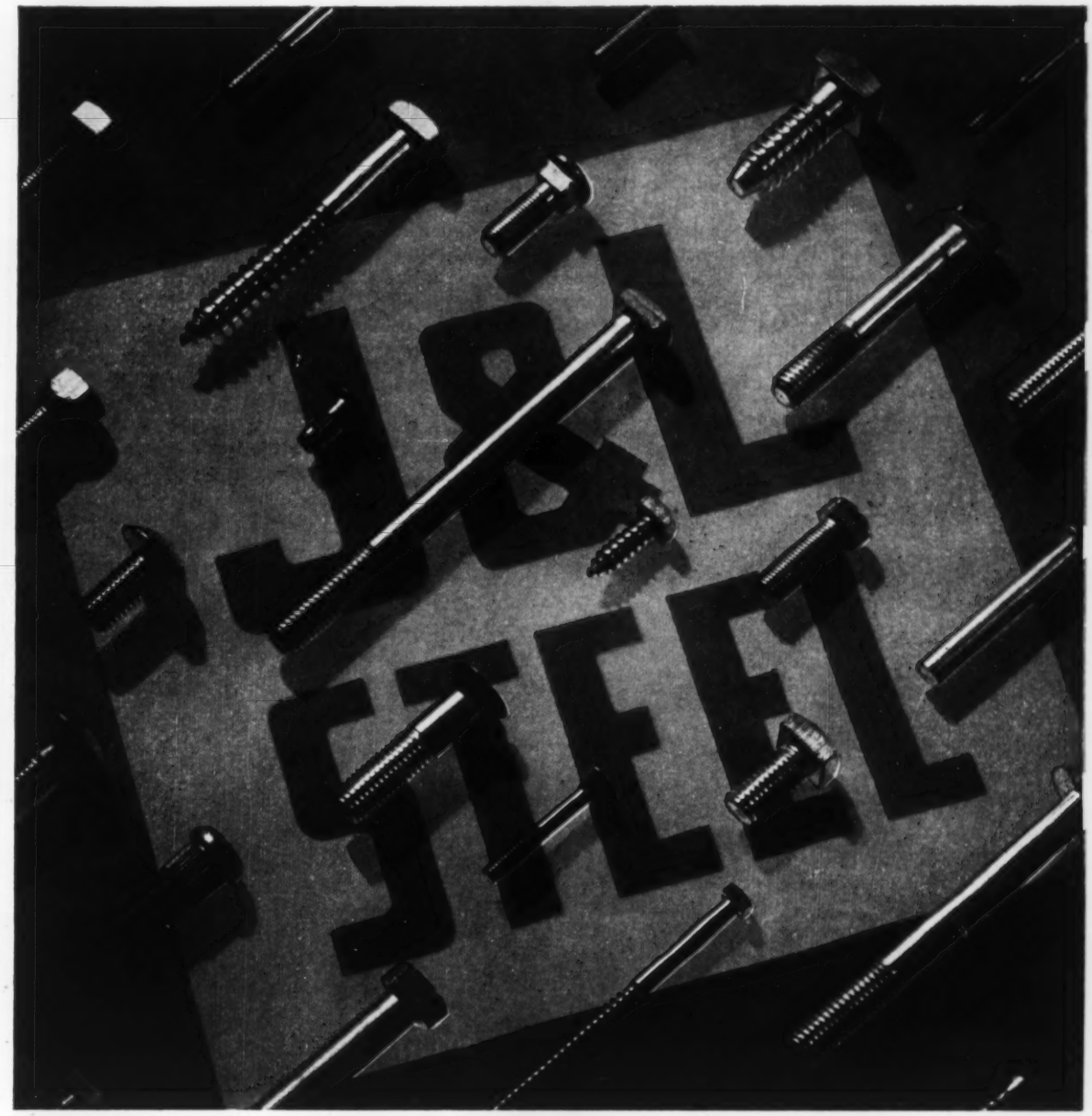
Clad-Steel Research

Physical properties of clad steels at ambient temperatures are well known, but little data exists on their behavior at prolonged elevated temperatures.

Initially, a new Lukens Steel Co. program will be concentrated on determining the properties of stainless-clad steel (18-8 type) at temperatures up to 1000° F. This particular clad steel was selected because of the difference in the physical properties of the stainless and carbon steel components. Emphasis is given to differences in thermal expansion and yield strengths and their possible effect on fatigue life under service conditions.

Data obtained will be useful in engineering design and stress evaluation for full-scale pressure vessels operating at high temperatures.

The major part of the program is being carried out at Franklin Institute, Philadelphia. The balance of it will be done in Lukens' Research Laboratories, Coatesville, Pa.



Get Production, Economy, Quality with J&L Cold Heading Wire

More and more profit-conscious wire users are turning to J&L for Cold Heading Wire that helps them get increased production, top quality and operating economy. They've found that J&L furnishes wire with—

- **High Plastic Deformation**
- **The Right Finish**
- **High Cold Malleability**
- **The Utmost Uniformity**

. . . in other words cold heading wire that consistently has the right chemical and physical properties.

The dependability of J&L Cold Heading Wire is the result of quality control from ore to finished product, rigid testing, modern equipment and over a hundred years of iron and steel-making experience.

Contact J&L and investigate the economies of using J&L Cold Heading Wire in your operation. Remember, it's tops in quality—competitive in price.

Jones & Laughlin

STEEL CORPORATION – *Pittsburgh*

Better Tube Finishing

J & L's new tube specialties department is ready for stepped up oil country demands

FINISHING facilities for producing oil country tubular products in the high strengths necessary for deep drilling are in operation at Jones & Laughlin Steel Corp.'s Aliquippa Works.

The new facilities make up an addition to J&L's seamless tube department costing $4.7-million. Housed in a new 100 by 725-ft structure, the Seamless Tube Specialties Department, is the first step in expansion of facilities for finishing high strength and special seamless tube products used in the oil industry.

Heat Treat Key — In the new specialties department, equipment of J&L design makes possible finishing of seamless oil country casing and tubing by quench and temper heat treatment, imparting to these products characteristics that formerly were attained through adjustments in the chemical composition of the steel.

By speeding up and improving the finishing facilities, the new installation will tend to increase the total output of J&L high-strength seamless pipe. It will also result in savings of many tons annually of strategic alloying materials—manganese, molybdenum and chromium—formerly used in steels for high strength seamless pipe.

Two Furnaces—The heat-treating equipment consists of two hearth-type mechanically-operated gas-fired furnaces, with a water-spray quenching unit between them. One furnace is a high-temperature furnace. The other is a tempering furnace.

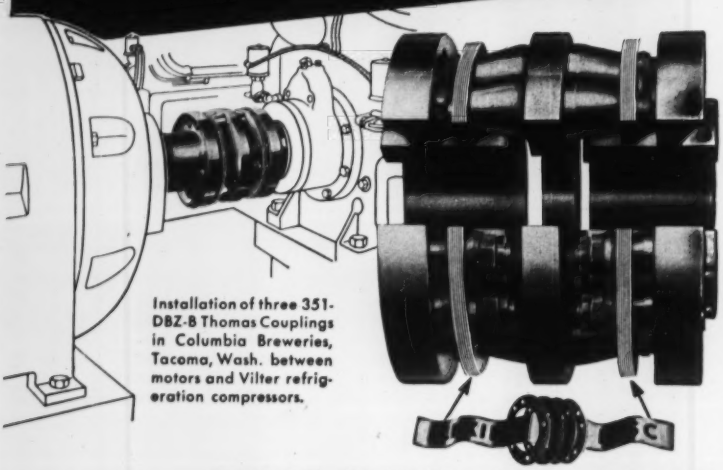
Processing of the various products may involve normalizing, or normalizing and tempering, of alloy steels; or quenching and tempering of plain carbon steels. Seamless pipe, produced in the existing mills, will come to the new department on new 15-ton side-operated lift trucks.

HIGH TEMPERATURE FURNACE
. . . exit at 1650 F

How They Work—When normalizing, the pipe passes through the high temperature furnace. By controlled heating and cooling through the transformation range of the steel, the grain structure is refined and made uniform.

When quenching, the pipe is first heated in the high temperature furnace above the upper

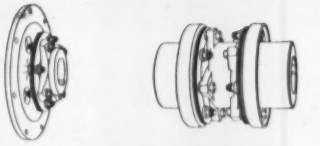
THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



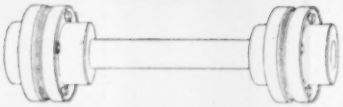
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

transformation temperature. Then it passes through the quenching unit, where it is water-sprayed with high-pressure injector-type nozzles.

Then the pipe passes through the tempering furnace. By gentle reheating, tempering restores to the quench-hardened steel the desired degree of ductility and toughness.

Unique Quench — The J&L-designed quenching unit, in which the pipe passes longitudinally through radially-directed water sprays, gives a more effective quenching action than their existing units. This has been accomplished by lengthening the quenching unit, making it possible to run the pipe through at greater speeds.

Other equipment in the new building consists of a three-stand sizing mill for sizing the pipe to

TUBE REDUCTION
. . . 3 stands do the job

exact diameter; a rotary straightener; a gag-press straightener; cut-off and threading equipment for final finishing operations; pipe storage racks, fuel oil storage tanks, and an office.

A 6900-v power line and sub-station building provide 60-cycle power to the new installation. Co-operating in the design of the entire installation were J&L research, technical services, production and engineering departments. The boiler shops at the Aliquippa Works built the rapid quencher.

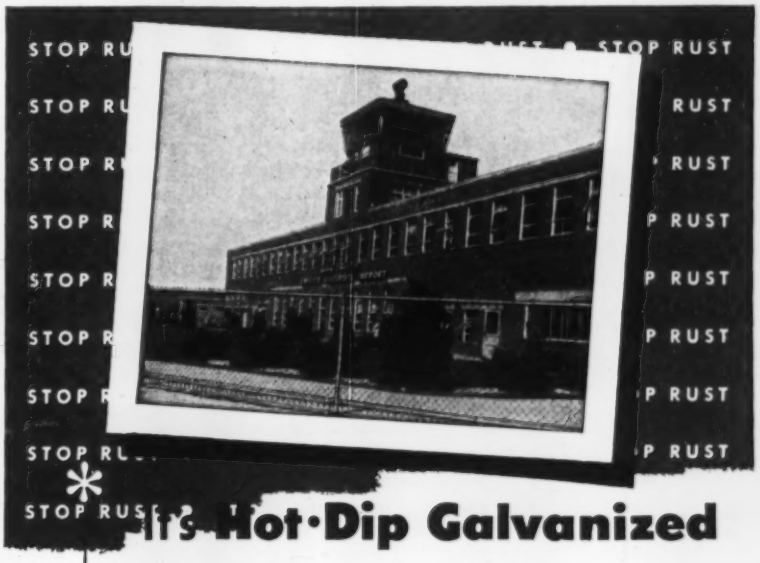
Oil country demands for an increasing proportion of high-strength pipe caused the expansion.

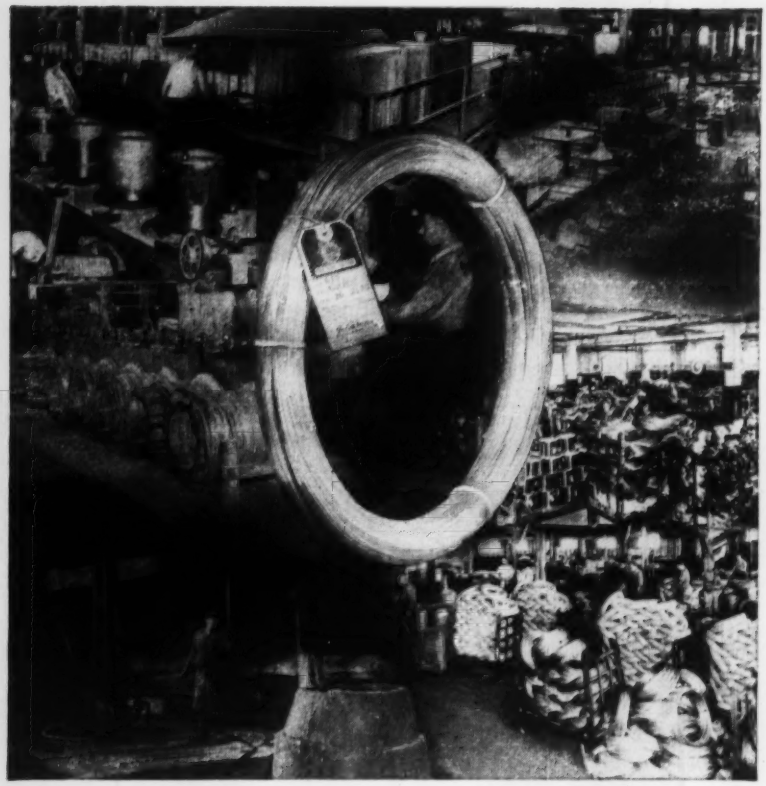
Testing Stainless Weldments

Many different tests are used to evaluate the characteristics, properties and service behavior of stainless steel weldments. Every test is not equally applicable to every type of material, weldment and fabricated structure.

To help you select the proper test, the Welding Research Council has prepared "Testing of Stainless-Steel Weldments." The following inspection methods are discussed: Visual; magnetic particles; fluorescent-penetrant; dye-penetrant; radiographic; ultrasonic; mechanical; corrosion; removal of trepanned plugs or boat-shaped (saw-cut); leak testing by hydrastatic method, air pressure, chemical indicators or mass spectrometers; etch testing for ferrite, carbides and sigma; restrained crack-sensitivity.

Copies may be purchased through the American Welding Society, 33 W. 39th St., New York 18, N. Y., for $1.


STOP RUST
STOP RUST
STOP RUST



Most folks know how to say nothing, but few of them when.

Our sales representatives are paid to talk, but always when they know what they are talking about. They may not be able to suggest an answer to some of the complex problems of the affairs of state, but, when they have something to say about high carbon wires they speak from the book of knowledge—compiled through more than a quarter of a century of Johnson experience in the drawing of the highest grade specialty wire. These are "custom made" wires, made by special equipment employing special skills and a conscientious endeavor to make the best—better.

JOHNSON STEEL AND WIRE COMPANY, INC.

WORCESTER 1, MASS.

New York Philadelphia Pittsburgh Cleveland Detroit Akron
Dayton Chicago Atlanta Houston Tulsa Los Angeles

A SUBSIDIARY OF PITTSBURGH STEEL COMPANY

Rugged Slab Shear

Design reduces table damage and bar distortion. Always cuts at 90 degree angle

THIS new mechanical motor driven shear, latest addition to the 40-in. blooming mill facilities at the Clairton Works, U. S. Steel Corp., cuts hot steel slabs up to 7 in. thick and 42 in. wide. It replaces a smaller unit.

Designed by Lewis Machinery Division, Blaw-Knox Co., Pittsburgh, the shear weighs 400,000 lb, has a maximum knife pressure of 2,200,000 lb, and a 13-in. combined up-and-down stroke. It will make up to 12 cuts per minute and is powered by a 250-hp motor.

LATEST AT CLAIRTON
. . . chops 7-in. slabs

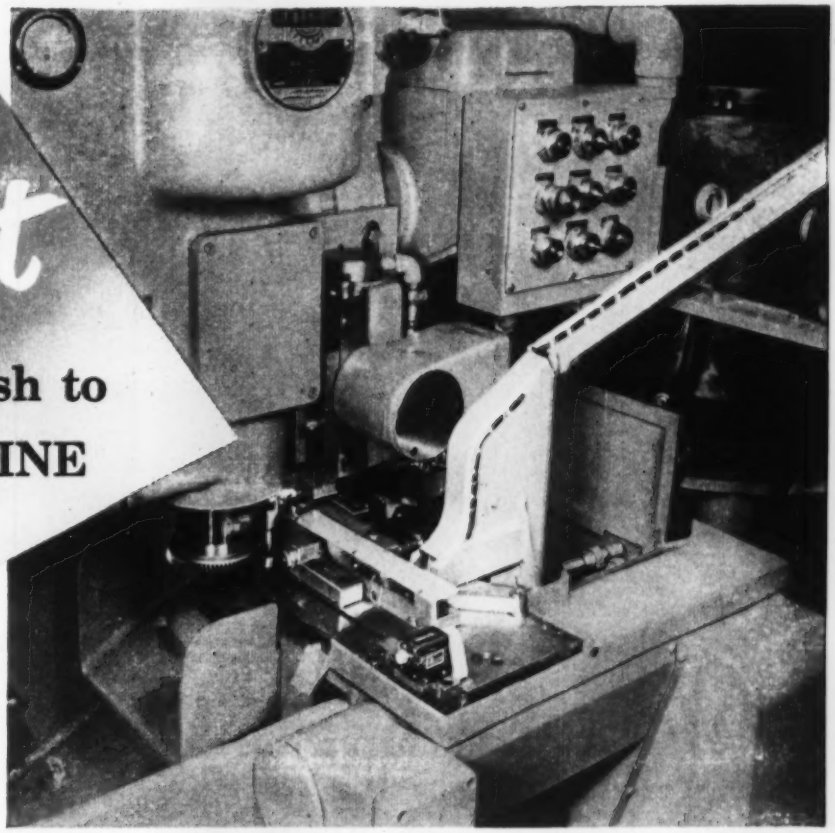
Unique Gag—On the entry side, the shear is fitted with a hydraulic hold-down or gag to prevent the ends of the sheared material from raising off the cutting table during shearing.

This gag is unique in design: It is equipped with a stabilizer which keeps it in a vertical position to the material to be sheared in such a way that blooms or slabs are always cut at 90 degree angles.

On the delivery side a pullaway table permits crops to fall down a chute to a chain-bar conveyor. It transports them from the shear up an incline and drops them into charging boxes, to be returned to the openhearths. A solid retract-

So Fast

you may wish to use MAGAZINE FEED!



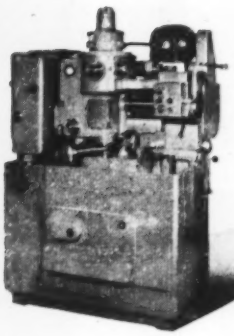
Shown above is the No. 4 GS Gear Shaper equipped for fully automatic loading, cutting and unloading.

★ *Fellows new No. 4 GS Gear Shaper ideal for mass output of automotive pinions*

Rotary feeds of .008″ to .024″ per stroke of a 4 inch cutter with a husky drive mechanism operating a 3⅜″ diameter cutter spindle at speeds ranging from 98 to 635 strokes per minute make the No. 4 GS Gear Shaper a high production machine for gears up to 6″ diameter and 2″ face width.

To utilize its production speed to the greatest advantage in the smaller size range, the No. 4 GS is designed to facilitate the addition of work magazines or other loading and unloading devices. Automatic feed production rate for 1 1/16″ diameter x ⅝″ face width automotive pinions is 1 per minute. Blanks are (1) fed from a feeding device down a chute to the magazine slide, (2) automatically located and clamped on an expanding arbor, (3) cut, (4) automatically lifted off the arbor and (5) ejected into the unloading chute.

It's a production man's machine – standard or automatic. Fellows Sales Engineers will be glad to tell you about it. Write nearest Fellows office.



THE Fellows GEAR SHAPER COMPANY

Head Office and Export Dept., 78 River St., Springfield, Vt.

Branch Offices: 319 Fisher Bldg., Detroit 2, Michigan • 5835 West North Avenue, Chicago 39, Illinois • 2206 Empire State Bldg., New York 1, N. Y. • 5 Martel Bldg., 6214 West Manchester Avenue, Los Angeles 45, California

For DEPENDABILITY

ERIE the correct fastener for the job!

Erie Fasteners are in wide use by the nation's leading builders of Transportation Equipment.

You can rely on over 40 years of experience in producing bolts, studs and nuts designed to withstand the effects of high and low temperatures, high stresses, fatigue and corrosion. Modern facilities enable our skilled craftsmen to produce to your specifications bolts, studs and nuts, precision machined and heat treated in carbon, alloy, stainless steel and non ferrous metals.

These Erie Products prove their quality every day in the railroad, chemical, petroleum and automotive industries; on farm, construction and industrial equipment and heavy machinery. Send your design and material specifications to us . . . we will make for you the Correct Fastener for the Job.

ONE OF THE 16 INTEGRATED COMPANIES
BARIUM STEEL CORPORATION
WORKING IN STEEL, ALUMINUM MAGNESIUM, FIBERGLASS

ERIE BOLT and NUT CO.
ERIE • PENNSYLVANIA

STUDS • BOLTS • NUTS
ALLOYS • STAINLESS
CARBON • BRONZE

Representatives in Principal Cities.

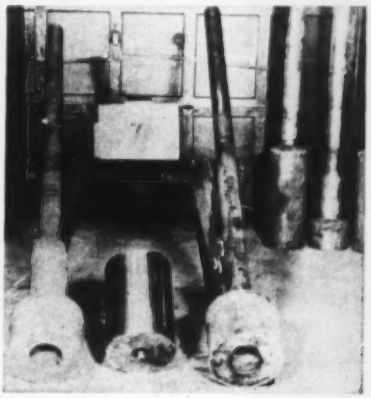
able forged steel gage head, which can be adjusted to varying lengths, stops blooms or slabs coming down the shear run out table. This gage head is raised to permit material to pass on to the cooling bed.

Gun Tubes Extruded

Extrusion of 57 mm and 75 mm recoilless rifle barrels shows production savings of 10 to 40 per cent over conventional methods.

Squeeze—Photographs released by Loewy-Hydropress, Inc., who carried out the research and development work for the U. S. Ordnance Corps give a clear picture of the work. Barrel and breech are extruded as one unit.

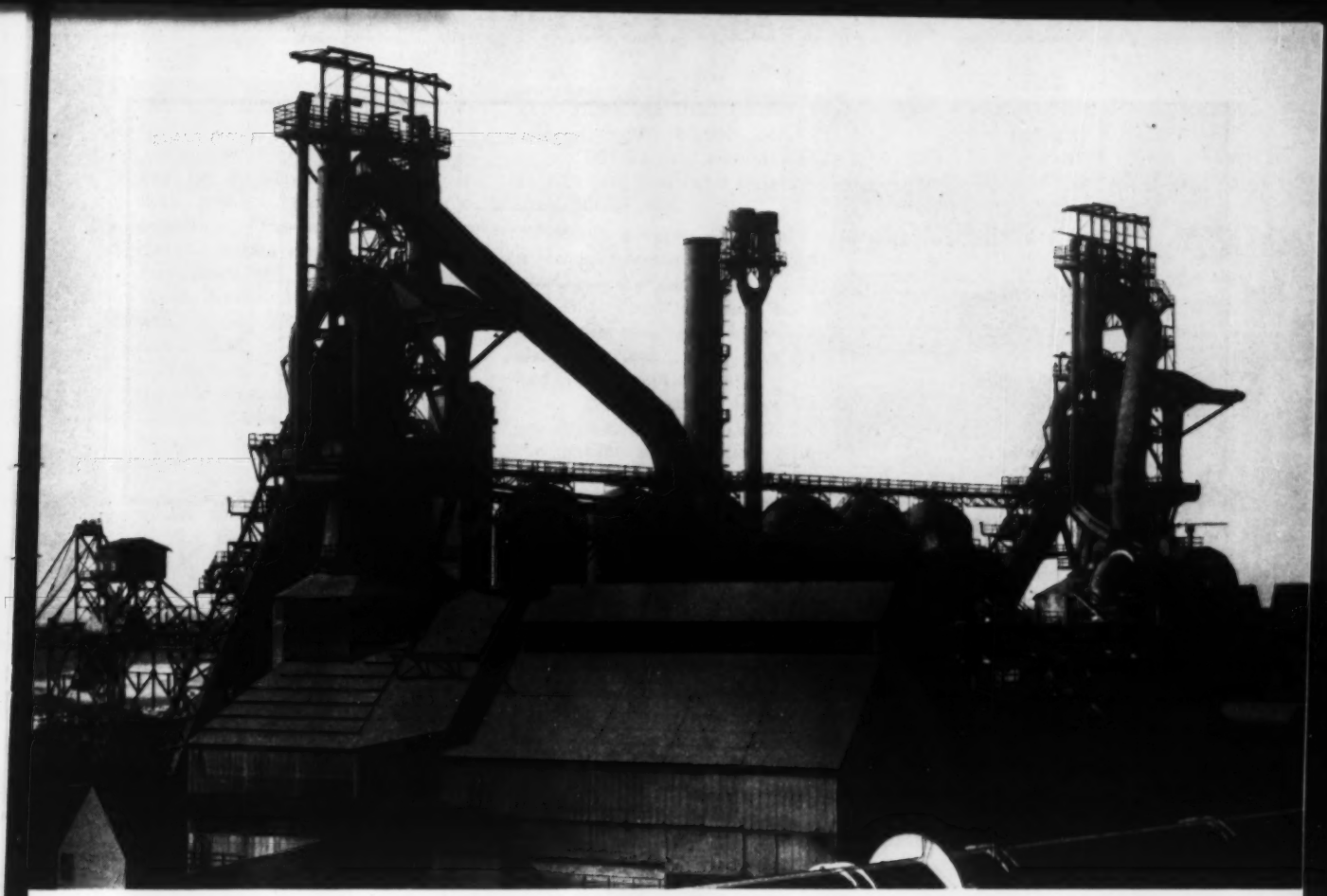
The extruded tubes are satisfactory in soundness, physical properties, straightness and dimensional tolerances. Inside and outside surfaces are smooth and even. A file cut was easily made, indicating good machinability.



Work stages in 57-mm gun tube extrusion. Billet in center foreground is SAE 4340 steel, weighs 178 lb

Section of gun tube, macro-etched to show metal flow

Longitudinal section of extruded 57-mm rifle tube



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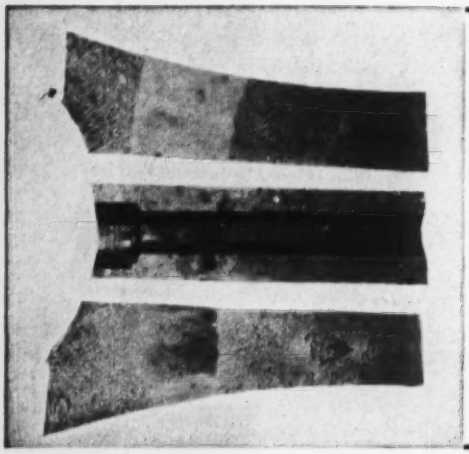

Fig. 5—Etched section of a connecting rod shows large welded area

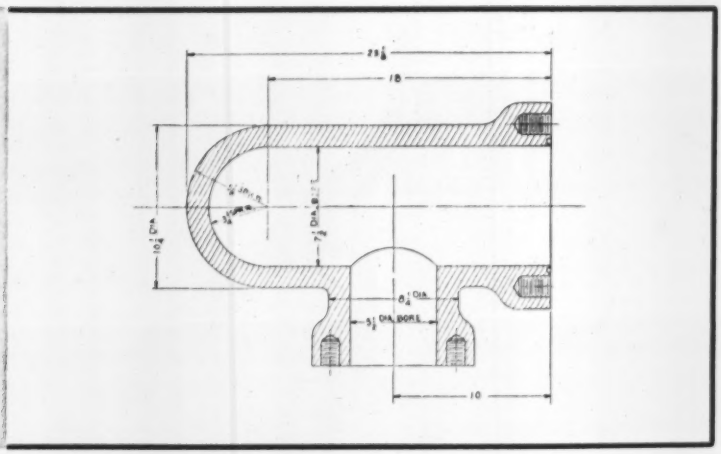

Fig. 6—Diagram of small pressure vessel used by Cooper-Bessemer to make comparative tests on cast materials

What Can You Do About Flaws?

It's a rare casting that doesn't pose this problem. Size, shape and distribution are the vital service factors. In Part 4, you'll find test techniques, welding procedures

By T. E. EAGAN
Chief Research Metallurgist
Cooper-Bessemer Corp.
Mt. Vernon, O.

This is the last in a series of four articles on cast ferrous metals by Mr. Eagan. Preceding articles covered specifications, physical properties, tensile strengths and modulus of elasticity, fatigue limits, wear and castability.

CERTAIN characteristics of cast materials influence designers adversely—but we usually don't talk about them. Actually, the designer knows about them and usually allows an ample safety factor. If he knew more about what he could expect, safety factors would be cut substantially.

Castings without internal or surface flaws are rare. Their size, shape and distribution are important to the designer because they can be the cause of failure in service.

Detection — Internal flaws, shrinks, blow holes, open cracks and other flaws can be detected by x-ray or gamma ray techniques. With such sensitive tools, you can reject any casting if you wish. ASTM Specification E-71 has two sets of radiographic standards, one for x-ray and the other for gamma ray. They recognize these groups of defects: Gas and blowholes, sand spots and inclusions, internal shrinkage, hot tears, cracks, unfused chaplets and internal chills.

There are degrees of value for each group. They also classify service condition requirements and standardize the classes as to acceptability. This specification can be used to advantage if you believe castings should have radiographic examination.

Expensive Inspection — Radiography is expensive. It costs about $1 per sq ft of photographic film, plus an initial investment of many thousands of dollars for equipment. Gamma ray equipment usually is cheaper than x-ray in initial investment, but the technique takes more time.

Plus the charge for radiographs, steel foundries customarily charge extra to furnish castings to radiographic standards because they know such standards cause a higher rejection rate. Such pricing can and does cause designers to turn to forgings.

X-rays or gamma rays seldom are used on S.G. iron, malleable iron, or gray iron castings. It can be done, but so far it hasn't been considered necessary. With the possible exception of the larger castings, it's cheaper to break up a few to locate the defects and correct them.

Supersonic — Nondestructive testing for internal flaws can be done with supersonic waves. This type testing is limited. It's best suited to uniform shapes, works best on steel and requires a relatively smooth surface to get best results. It requires good knowledge of the action of sonic waves to interpret results, especially if the casting has contours.

The damping capacity of gray iron makes this type test relatively useless when sections become thicker than about 1 in., and even then some determinations become questionable. Several tests on S.G. iron haven't been sufficiently conclusive to recommend the practice for this type material, although apparently there's no rea-

son why it wouldn't be satisfactory.

Magnetic Powder—Surface flaws can be determined by the magnetic powder method or by a dye penetrant. The magnetic powder method shows cracks, seams, surface flaws etc., even if they are ¼ in. under the surface. It also will show other metallurgical flaws that often require further exploration. The dye penetrant, or the old fashioned oil and chalk method, shows cracks or other defects on the surface that actually are open.

A combination of the two often is used to check on flaws indicated by the magnetic powder method. ASTM Specification A272, "Magnetic Particle Testing and Inspection of Commercial Steel Castings," is recommended for use on all ferrous metals where this inspection is used. Again, foundries customarily add extra cost on castings getting this inspection.

Welding—All ASTM steel castings specifications regulate welding of defects. According to A148, minor defects that will not ultimately impair strength of the castings may be welded by an approved process. Defects will be considered minor when depth of the cavity prepared for welding is not greater than 20 per cent of actual wall thickness, but in no case greater than 1 in. Minor defects can be welded without securing the purchaser's approval. Other defects can be repaired with the purchaser's consent. All welds shall be given a suitable stress relief or heat treatment.

The AWS Welding Handbook states that weld efficiency, as far as endurance limit is concerned, is 60 to 80 per cent of the original metal's endurance limit for low carbon, welding type materials. The higher tensile type materials are much more notch-sensitive, and no information is available on reduction in fatigue strength.

Policing—It's recommended that strict policing of welding practice be made. For instance, the recommended practice is to choose electrodes that have about the same tensile strength as the casting to get best results. In many castings this isn't done. An example, Fig. 5, shows the cross section of a casting purchased to this minimum specification: Tensile strength, 85,000 psi; yield point, 55,000 psi; elongation in 2 in., 22 per cent; and reduction of area, 40 per cent.

There's a large area welded in a critical section of the casting, plus several voids in the weld metal. But worse is the fact that the wrong welding rod was chosen. Tensile properties of the parent and weld metals shaped up like this. Tensile strength is 54,800 psi in weld metal, 110,000 psi in the parent metal; yield point is 40,000 psi in weld metal, 92,000 psi in parent metal; elongation is 17.5 per cent in weld metal, 5 per cent in parent metal.

In this case, the area of weld metal covered more than half the casting. Luckily, we caught it before damage was done.

Practices — Usually, there's a sharp demarkation between the parent metal and the weld metal. This always will act as a stress raiser and will tend to lower the endurance limit appreciably because it acts as a notch.

Preheating the casting before welding is important to avoid cracking of the weld and to keep away from excess distortion during welding. This precaution, although carefully spelled out in recommended practice, is not always followed. Local heating around the spot with a torch is common, causing troubles with distortion and excess residual stresses.

If we are to repair a defect, that defect should be completely removed before welding. It's not uncommon to find that this hasn't been done.

Stress Relief — Recommended practice states that stress relieving or complete heat treatment is necessary after welding. Many inferences, although no positive statements, have been made that all that is needed is a stress-relief anneal. It's common practice to stress-relieve anneal the low-carbon, low-tensile type materials that have been limited as to chemical analysis, such as A27 and A216.

But this practice can't always be recommended for alloy castings furnished on A148 or other specs of the same nature. The reason: The heat-affected zone between the weld and the parent metal has been carried through a heat transformation that may weaken it considerably. A complete reheat treatment is recommended for this type casting.

Welding Structures — When proper analysis of metal is used, many structures are made up by welding several castings together. This is a commendable practice. In many cases weldments of this nature allow the foundries to cast the sections and feed them properly, eliminating much of the difficulty otherwise met. The structures are designed for welding, thus precautions that insure proper strength have been taken.

Welding Other Types—It's easier to get a sound casting in S.G., malleable and gray iron. This doesn't mean that welding is not done but rather less of it is permitted or is worth while with these materials.

S.G. iron welds somewhat like gray iron. Usually the same type welding rod is used. In all cases, the casting should be heated to around 800 to 1000° F before welding. Even then there's danger of forming a martensitic zone between the weld metal and the parent metal, which requires further heat treatment to remove. In the case of gas welding, the fusion zone may change to gray iron with flake graphite, which cannot be rectified by any heat treatment. Recommended: Use a specific rod containing magnesium.

S.G. iron is so new we don't know everything about it. At this stage of the game it's recommended that welding should not be permitted in highly stressed areas. Instead, confine it to fill-welding of unstressed areas for appearance. Malleable iron does not lend itself to welding.

Welding Gray Iron — Under proper practice gray iron is repair welded satisfactorily. Most important is that the casting must be heated to the proper temperature and the proper welding rod used. Temperature varies with type of welding and type of rod.

Many companies do not allow welding in highly stressed sections of gray iron castings, but permit fill welds in unstressed areas. Gas welding usually is allowed in areas that have more stress on them

(*Please turn to p.* 162)

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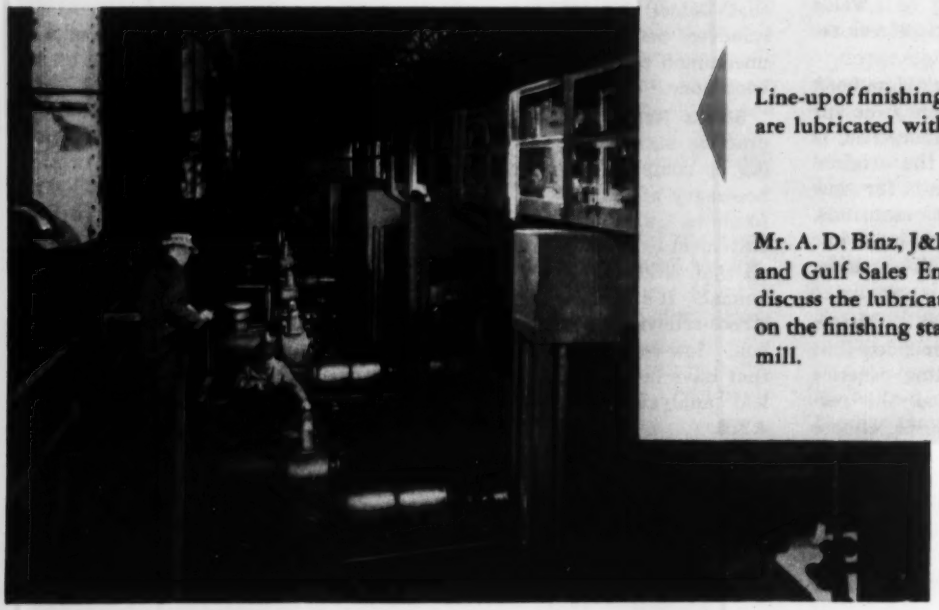

Line-up of finishing train pinion stands. All are lubricated with Gulf E.P. Lubricants.

Mr. A. D. Binz, J&L Lubrication Engineer, and Gulf Sales Engineer C. D. Gilchrist discuss the lubrication of the mill pinions on the finishing stands of the 96" hot strip mill.

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TABLE 7

Physical Properties of Pressure Vessels made of Different Materials

	Class 40 Gray Iron	Special Alloy Gray Iron	Cast Steel	S.G. Cast Iron
Tensile Strength, psi	44,700	71,900	72,200	67,400
Yield Strength, psi 0.2% offset	*	*	45,600	52,500
Elongation, per cent	**	**	20.5	6.0
Reduction of Area, per cent	**	**	25.1	4.7
Hardness, BHN	180	254	141	180
Impact, ft-lb	17†	28†	28§	3 blows
Endurance limit, psi	16,000	24,500	26,000	21,500
Bursting Pressure, psi	7,200	8,250	16,200††	14,750

* The yield strength was not determined.
** There is no appreciable amount of elongation or reduction of area in gray cast iron.
† Unnotched 0.798 in. diam. bar.
§ Standard 0.3 in. diam. notched bar.
†† Steel vessel did not burst but distorted beyond ability to seal the pressure.

(*Concluded from p. 159*)

than is allowed with electric arc.

All welded castings in gray iron should be stress relief annealed.

Residual Stresses — Residual stresses in castings can be helpful or detrimental, depending on their direction. They're helpful when in compression in the direction in which imposed stresses are in tension; if they're in the opposite direction, they are detrimental. Unfortunately, it's difficult to tell in which direction they may be in almost all castings. So it's not safe to assume that castings, with these stresses in them, are usable unless stresses are determined.

Stresses normally are removed from steel castings during heat treating. This also is true of malleable iron and annealed S.G. iron (Grade 60-45-10). In gray iron castings or the as-cast S.G. iron, stresses are not removed unless they are given a stress relief anneal. This generally isn't done unless it's specified. Normal practice calls for stress relief anneal only on castings having high tensile strengths, that are heavily loaded in service and are liable to go out of shape in machining.

Testing—It's not always sufficient to know the physical properties and characteristics to apply the right type metal. Important also is proper design. The best possibilities can be developed by using the correct combination of the two. Testing castings for stress distribution and developing the best stress pattern have added immensely to proper use of castings. Most of this is done by using inexpensive strain gages.

Another good test is fatigue testing the component (or sometimes the structure as a whole) to determine it's structural durability.

Design Comparisons—Seldom is there opportunity to compare the relative value of cast ferrous materials using exactly the same design. Such a test performed at Cooper-Bessemer is significant.

To determine relative merit of S.G. iron as a compressor material, we designed the small vessel shown in Fig. 6. It was cast in the following materials:

1. Cast steel, ASTM A27, Class 65-30
2. S.G. iron, ASTM A339, Grade 60-45-10
3. Gray iron, ASTM A48, Class 60
4. Gray iron, ASTM A48, Class 40

Results of the tensile and fatigue tests of these materials taken from the vessel are given in Table 7. Tensile strengths of the cast steel, S.G. iron and class 60 gray iron are about the same. Cast steel and S.G. iron are the only two materials that show yield strength, the S.G. iron being much higher than the cast steel. There's a great difference between elongation of these two materials, the S.G. iron being the lower. The three highest tensile materials have endurance limits within 4000 psi.

Significance of burst results is the fact that the ductile type materials require a bursting pressure almost twice that required for the nonductile types, regardless of whether tensile strength is equal.

Fatigue Test—Cylinders finally were subjected to a hydraulic pulsating fatigue test. Pressure was varied from atmosphere to some maximum pressure that could be varied. After 10 million impulses at any pressure a new cylinder was tested at a higher pressure until failure. Results: Gray iron, class 40 had a 1450 psi pressure fatigue limit; gray iron, class 60, 2350; S.G. iron, grade 64-45-10, 3100; and cast steel, A27 65-30 had 3350.

Rating—Based on these results, plus results obtained with strain gages, our engineering department rated these four materials on this percentage: Cast steel, 100 per cent; S.G. iron, 93 per cent; class 60 gray iron, 70 per cent; and class 40 gray iron, 43 per cent.

A more elaborate fatigue test on a complete compressor cylinder proved that class 40 gray iron can be used successfully at discharge pressure up to 1200 psi, with a suction pressure as low as 450 psi. Previously, this type material was limited to 1000 psi maximum pressure.

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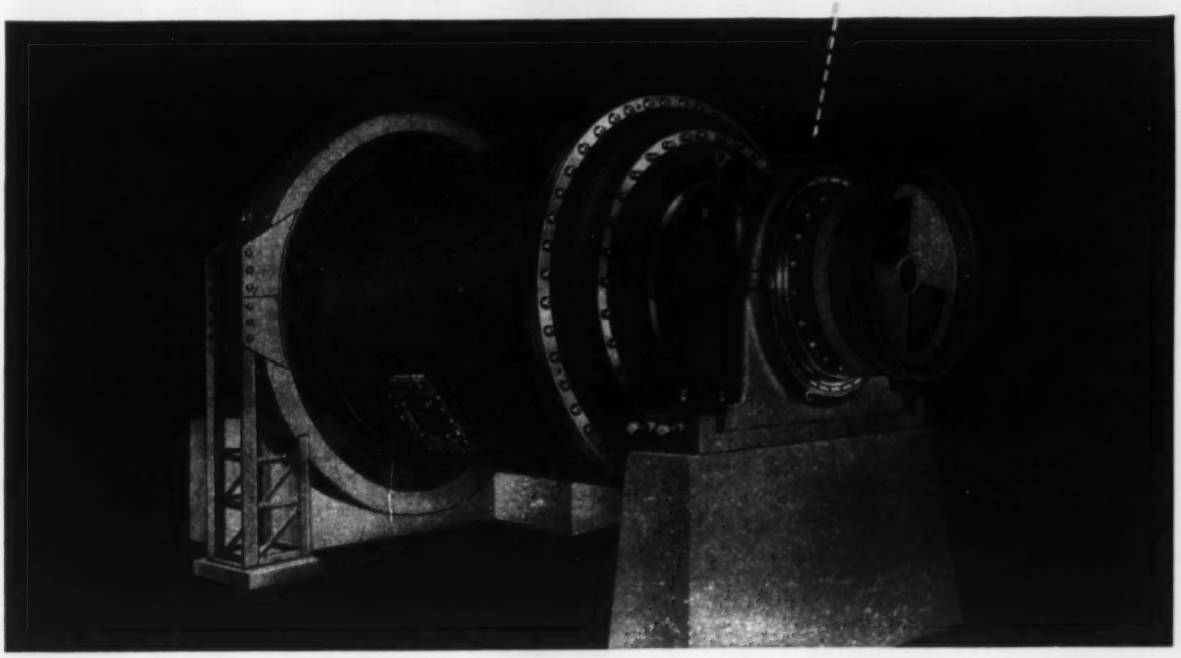

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Consumable electrode method is possible. New power sources pave the way

MAGNESIUM is now on the list of metals readily weldable with consumable electrode inert gas-shielded welding. The point was proved in a technical paper at the recent Magnesium Association meeting in St. Louis.

For the past several years the process has been notably successful in welding almost all metals except magnesium. Early attempts were only partially successful because of unfavorable arc characteristics developed with then existing power supplies. But with the recent development and introduction of several constant potential power sources, the re-examination of the process for magnesium was undertaken.

Equipment Needs — Essentially the power sources are direct current machines, either of the motor-generator or the dc rectifier type. For most metals, reverse polarity (electrode positive) connection is used. Variables concerned are wire speed, arc current, arc voltage and arc length.

In operation, the wire speed is varied and this variation determines the correct current which will be supplied to melt the wire at the rate supplied. This is accomplished at either a constant arc length or a constant arc voltage. Current cannot be adjusted on the welder since it is determined only by the rate of wire feed and therefore some equipment has no current indicator.

Little Difference—Results of the appraisal of the several power supplies indicated that satisfactory performance with all types was possible. From the practical viewpoint, there were no outstanding differences, although theoretically, best performance could be expected from a power supply which could match the volt-ampere characteristic of the metal in question.

The three types studied were the dc-mg set with rising volt-ampere characteristic, dc-mg with flat or slightly rising characteristic, and the dc-rectifier machine

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with drooping characteristic. Though results to date are reported from laboratory work only, flat, horizontal and vertical down welds were made at speeds ranging from 24 to 38 ipm.

Results—Low voltage drop metal transfer arc was found satisfactory for welding materials below ⅛ in. thick. As with the spray transfer arc, the 0.050, 0.064, and 0.092 in. diameter wires could be used as well as smaller sizes. Argon gas, at 13 to 18 arc volts, resulted in the best welding conditions.

Metal deposition rates were high and the welding speeds were the same as for the spray transfer arc. Because of the low arc voltage, the welding conditions were critical and the chief problem was the stubbing of the electrodes against the work piece. Welds were equal to tungsten arc welds in strength and soundness.

Principle advantage of the consumable electrode process is the welding speed—two to four times that of the tungsten arc. However, because it lacks the flexibility for general, all-purpose use it may supplement tungsten arc but will not replace it at this stage in the development.

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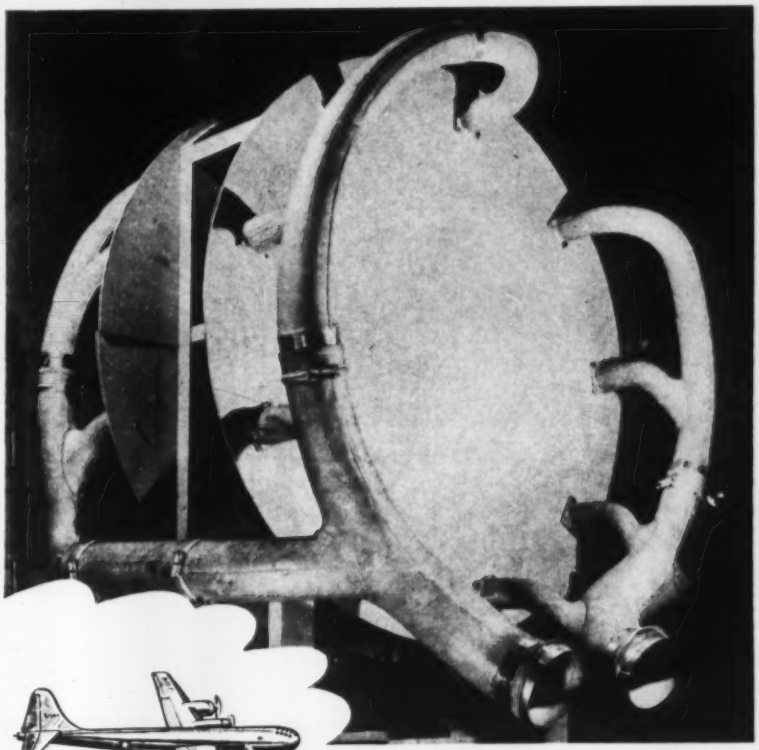

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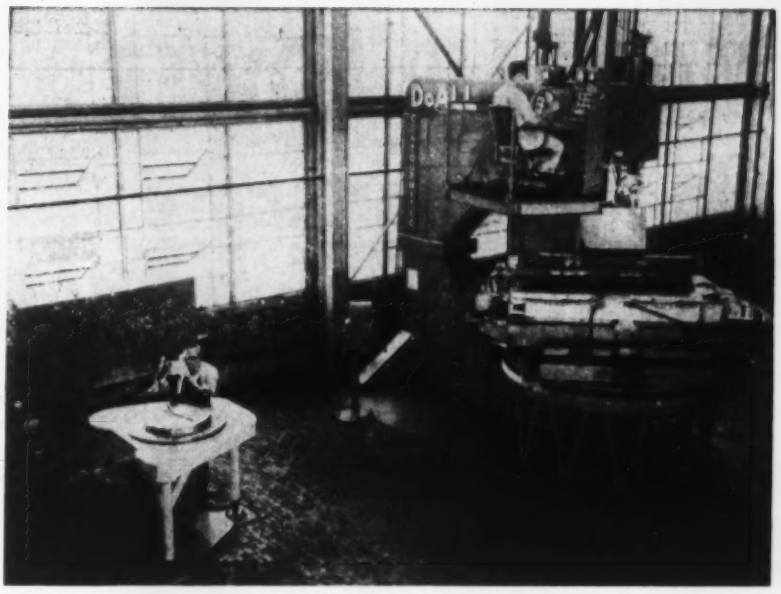

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Big Dies Call for Big Machines

Custom-built units cut extrusion-press dies. Band saw operator guides the work with a steering wheel. Periscope shows him what's happening

WHEN Alcoa started in on the heavy extrusion program at their Lafayette, Ind., plant, one of the first problems to arise involved the preparation of dies for their 14,000-ton extrusion press.

Part of the answer comes with the giant band saw and filing machines custom-built for Alcoa by DoAll Co., Des Plaines, Ill.

Driver's Seat—One unusual feature of the band sawing machine is the remote-control operator's station. The control is a steering wheel that works about like the one in an airplane.

To move the work into the saw blade, the operator pushes the wheel forward; to retract the work he pulls the wheel toward him. He turns the control wheel to the right or left as required to follow a curved line or a complete circle.

Third Eye—The operator has a closeup of the cutting action through a viewer that uses a periscope-type mirror arrangement. Since he doesn't touch the work, the operator has no sense of feel, but to compensate for this he has a set of indicating controls with strain gages. They keep him posted on the pressure value between the work and the saw, and these controls also will maintain a preset pressure.

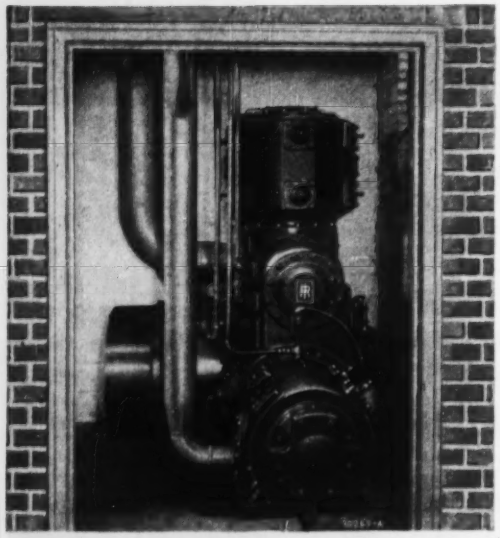
The machine will cut any material up to 26 in. thick. The working area is 52 in. square and the machine will handle a workpiece weighing up to 10 tons.

Filer—After the extrusion dies have been machined on the band saw, the die aperture is finished on a die filer. On this machine the die remains stationary on the work table and the file is directed against it—a concession to the huge workpieces.

To operate this filer, the operator swings the entire filing head. This is made easy by suspending the entire filing frame on hinges associated with an arm which, in turn, floats on the heavy pedestal. Special antifriction bearings used for the hinges, plus the lightweight box-type construction permit swinging of the filing head with negligible effort.

MORE AIR POWER in less floor space

That's one of the many advantages offered by this space-saving **XLE** *compressor:*



A bronze company squeezed this XLE into a small, unused storage room.

Packaged design for minimum floor space, and specially balanced for minimum foundation... ideal for skid-mounting.

Easy to operate... push button starting, grouped controls, automatic force-feed lubrication, automatic condensate removal, automatic air-operated starting unloaders and capacity control.

Easy to install or relocate... ready-to-run, assembled shipment ... simplified air and water piping.

Easy to maintain... simplified long-life construction... full-floating, cool-running, aluminum-alloy bearings that require no adjustment... no need to open the sealed crankcase which stays clean inside... streamlined exterior also easy to keep clean.

Low operating costs... new high-efficiency, long-life I-R Type A Channel Valves result in compressor efficiency comparable to the largest units... durable, high-efficiency tube-and-fin intercooler saves water... efficient direct-connected motor.

Built for reliable, continuous full-load service... sizes 125, 150, 200, 250, 300, 350 horsepower... discharge pressures 80 to 125-psi, two stage... write for more information today.

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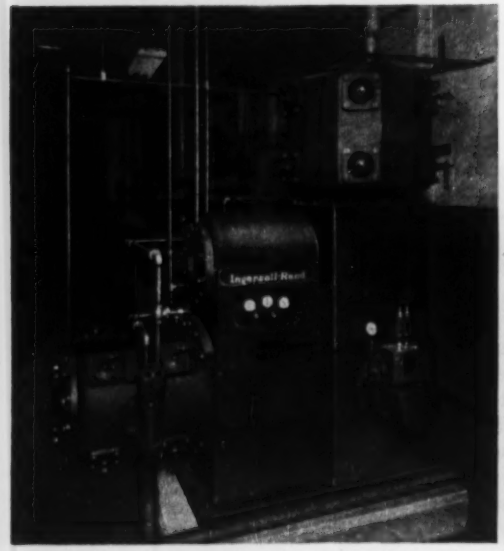
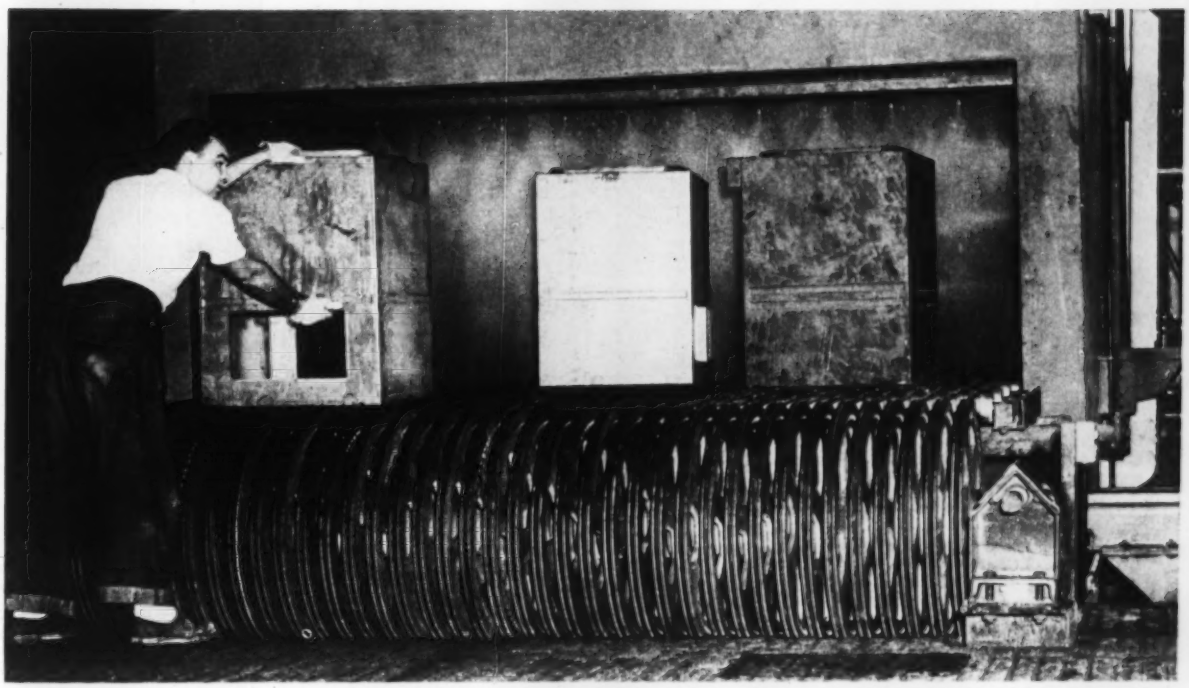
DIESEL AND GAS ENGINES



A safety-razor manufacturer found plenty of space for this XLE installation in a screened-off basement corner.

And here's a compact, space-saving installation of an XLE compressor, aftercooler and air receiver in a tool plant



Into the tunnel go washer cabinets. When they emerge 175 ft later, they will be ready for porcelain enameling

Appliances Take Acid Shower

Two pickling lines at Hotpoint are in tunnels. In their dark interiors acid and alkaline jets prepare metal surfaces for porcelain enamel

A PARADE of parts for clothes washers and dryers is taking acid shower baths in a huge automatic spray pickling machine at the Hotpoint Co. plant in Chicago.

The tunnel shaped pickler, which is 175 ft long, automatically conveys unfinished parts through a series of compartments. Here pressure sprays of alkaline, acid and nickel sulphate solutions prepare the parts for porcelain enameling.

Rubber Covered — An endless conveyor of rubber-covered steel cables moves the parts through 11 separate operations. Interior surfaces of the machine are also lined with rubber to protect them against corrosive pickling acids.

Engineered and built by Industrial Products Division of B. F. Goodrich Co., Akron, O. in association with Edward Curran Ltd., Cardiff, Wales, the new machine is the second of its type installed in the Hotpoint plant. The first machine, a smaller twin, has been in operation since October, 1953, pickling refrigerator liners.

Hot Shower — As washer and dryer parts move through, a hot alkaline spray removes loose material clinging to the metal. Next, a spray of sulphuric acid removes rust and scale and etches the surface to improve adhesion of porcelain. A deposit of nickel is sprayed on the parts also to increase porcelain adhesion.

Sandwiched between these operations are hot and cold rinses. A final spray of alkaline neutralizer keeps the metal rustproof for several hours.

No Fumes — The machine is fume free, with the acid section in the center and isolated by a fresh water rinse curtain at either end. The curtains prevent acid fumes from escaping and return acid condensate to the reservoir for greater economy.

Because of this rigid fume control, the pickler could be installed in any part of a plant including the production line. An interlaced conveyor may be used to connect the pickling unit to a furnace or other equipment.

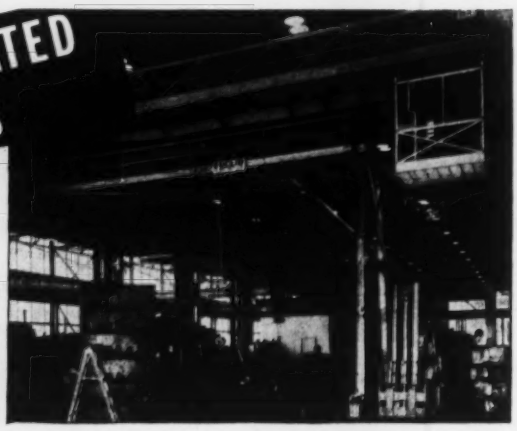
Fine Finish—According to the makers, spray pickling gives a better finish than is obtained by dipping. Results are uniform and the etch is good. There are few rejects.

Installations of the spray type are used to process bath tubs, panels for electric and gas stoves, fluorescent light reflectors, copper rod in coils, steel sheets and other ferrous and nonferrous articles.

CO-ORDINATED UNITS

in...

EUCLID Electric CRANES



Planned cooperation between material handling units can be a vital factor in speeding production and lowering cost.

Here, for example, is a Euclid half-gantry crane designed to cooperate with the larger Euclid overhead crane and lift trucks. The installation is in the assembly bay of a large steel fabricating plant.

Parts are brought in by the lift truck. Sub-assemblies are handled by the half-gantry crane. As the assembling operations progress the larger units are moved by the overhead crane and the completed machine finally carried to the testing department.

Think of cranes as production tools and ask our engineers to give you the benefit of their long experience in speeding production with overhead handling equipment. It will entail no obligation.

The EUCLID CRANE & HOIST Co.
1365 CHARDON ROAD
EUCLID, OHIO

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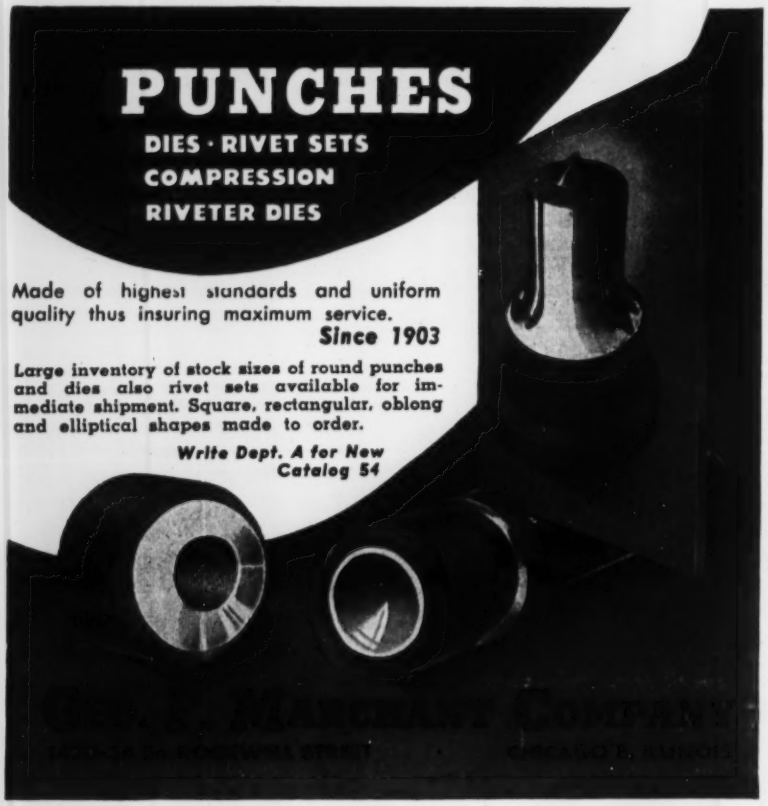
DIES · RIVET SETS
COMPRESSION
RIVETER DIES

Made of highest standards and uniform quality thus insuring maximum service.
Since 1903

Large inventory of stock sizes of round punches and dies also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. A for New Catalog 54



Longer Insulation Life

For first time, all materials in insulation system are natural insulators themselves

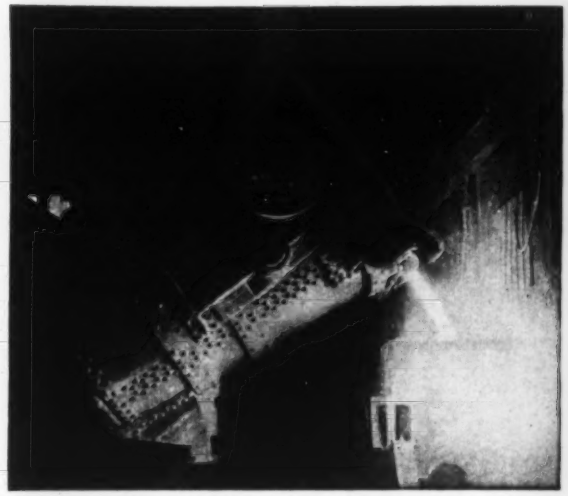
COIL INSULATION with 50 per cent longer life than conventional systems is now available on General Electric induction motors of 100 to 3,000-hp rating, according to the company's medium induction motor department. Described by G-E engineers as the most significant development in form-wound insulation in 50 years, the new Polyex insulation increases dielectric strength by 50 per cent and mechanical strength by 600 per cent.

For the first time, materials in an insulation system are natural insulators in themselves, the engineers said. Previous systems have had cotton or paper bases, which in themselves are not insulating materials.

Uses Synthetics—Utilizing Mylar*, Dacron, and synthetic hydrocarbon resin, Polyex insulation is the first complete change in large motor insulation since the turn of the century, they pointed out. At that time, insulation acted only as a spacer to form a dielectric air space between coils. Later improvements included soaking the spacer material in linseed oil, adding insulating materials, and finally the development of cambric cloth, which still utilizes non-dielectric materials.

INSULATION PASSES TESTS
. . . best thing in 50 years

Heat aging tests of the new insulation show large increases in



STEEL OUTPUT INCREASED BY 110 TONS PER DAY REPORTS STEEL PRODUCER: Tap-to-tap time reduced from 18 to 12 hours . . . Fuel cut 46% per ton produced . . . Tonnage up 50% daily! That's the job Cities Service Heat Prover helped perform for one of the largest steel producers.

"COMPLETED 30 HOUR TEST IN JUST 6 HOURS!" "We completed what normally would have been a 30 hour test in just 6 hours," writes the Eclipse Fuel Engineering Co. of Rockford, Ill. "We found the Heat Prover equally exact, perhaps more exact than standard commercial testing equipment."

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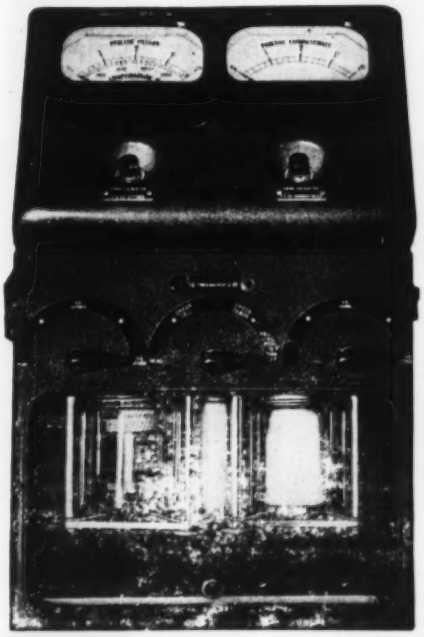
PRODUCTION UP, COSTS DOWN WITH CITIES SERVICE HEAT PROVER



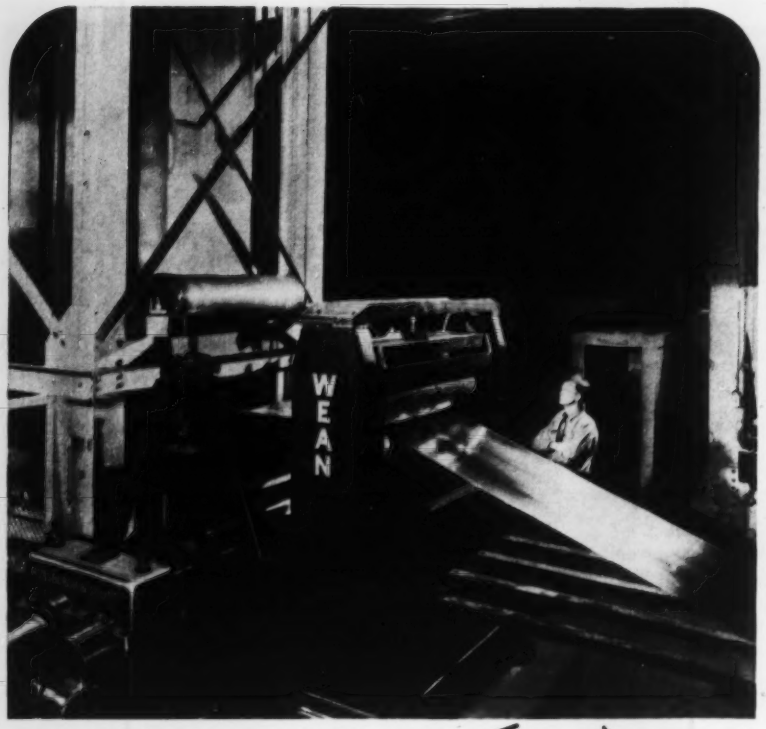
THE CITIES SERVICE HEAT PROVER . . . Not an instrument that you buy . . . but a service we supply . . . FREE!

Shown above are just two of the many outstanding accounts of the Heat Prover's impressive accomplishments. Wherever a furnace operation is involved, the Heat Prover can help increase productivity by providing:

- **Rapid, continuous sampling**
- **Simultaneous reading of oxygen and combustibles**
- **Direct measurement of oxygen and combustibles**
- **Easy portability**
- **Free maintenance and re-calibration service**

Learn how the Heat Prover, supplied and maintained free by Cities Service, can benefit you. For details, contact your nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York City 5, N. Y.

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS



. . . for continuous
uninterrupted service
H & S Speed Reducers Are Used

The above illustration shows an H & S reducer driving the main pulling bridle in a Wean continuous tower type annealing line for tin plate at a large steel corporation. It replaces the batch annealing process and produces a much more uniform product . . . with a great saving in floor space. H & S reducers were selected for their excellent construction and reliability (*freedom from down time*).

This is only one instance where H & S is helping industry do a better job . . . our engineering department is always at your service.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

Send note on Company Letterhead for 488-Page Catalog 49

mechanical and dielectric strength. Resistance to contaminants, shown by salt water immersion tests, is reported at least twice that of conventional insulation.

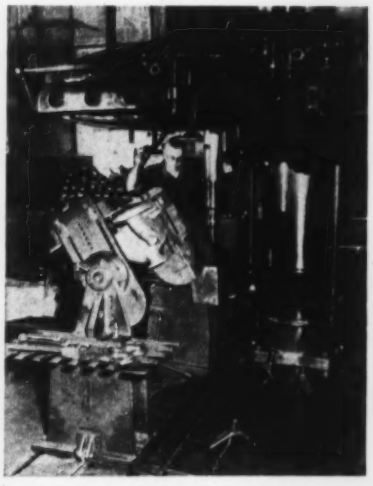
In one of the most exacting tests, coil power factor of Polyex insulated coils was substantially lower than coils insulated by conventional systems.

Home-Made Drill Fixture

A SIMPLE trunnion fixture for radial drill has cut set-up time, eased holding problems, and improved the accuracy of jobbing work at De Laval Steam Turbine Co., Trenton, N. J. Shown in the accompanying photo is a pump cover mounted in the trunnion fixture. Rotation is accomplished in this case by power supplied through the spindle of a radial drill.

Home-Made—The fixture, made in the De Laval machine shop, consists of a bed mounted on two A-frames that may be clamped at any point along the bed. An index plate, shaft-connected to a worm-gear drive, is mounted on one A-frame. A side-plate attached to the index plate and a matching side-plate on the tailstock A-frame are adjustable for height.

Jig plates can be made in standard sizes to fit these trunnion fixtures. Work may be drilled in various planes with a single clamping, and with the addition of an index plate to the jig plate, any compound angle can be secured.



DRILLS IN VARIED PLANES
. . . *with single clamping*

There's no *"...or equal"* for EASY-FLO and SIL-FOS

EASY-FLO and SIL-FOS are the original low-temperature silver brazing alloys conceived and perfected by Handy & Harman metallurgists.

Years of research went into the development of the alloys and the manufacturing methods and quality controls used in their production. In composition, in physical properties and in unvarying uniformity, EASY-FLO and SIL-FOS alloys stand alone.

It is from these exclusive features that EASY-FLO and SIL-FOS alloys get their remarkably fast brazing action and ability to make high-strength, liquid and gas-tight joints, consistently and at surprisingly low cost. That's why there's no *"or equal"* for EASY-FLO and SIL-FOS alloys when it comes to fast, reliable, economical metal joining.

and there's no *"...or equal"* for these SERVICES

The following technical and practical assistance is available, without cost or obligation, to all users of EASY-FLO and SIL-FOS alloys through Handy & Harman's engineering and research departments, field service staff and nearest distributor.

DEMONSTRATIONS of EASY-FLO and SIL-FOS silver brazing in your own shop.

SURVEYS of your metal joining to determine if and where EASY-FLO or SIL-FOS brazing can benefit you.

DESIGN AID for your engineers to assure best joint design for EASY-FLO or SIL-FOS brazing.

SAMPLE BRAZING of your parts by our technicians to determine the best way to silver braze them.

PRODUCTION AID to help work out the procedure that will give you the output you want at lowest cost.

OPERATOR TRAINING of your key men in our brazing schools, or by a program we set up in your plant.

RESEARCH in our laboratories to work out your special silver alloy brazing problems.

SEND FOR THIS LIST AND BULLETIN

You can get the real EASY-FLO and SIL-FOS alloys, and their companion low-temperature HANDY FLUX, only from Handy & Harman Authorized Distributors. They're located in principal centers throughout the country. Write for the "Distributor List" and contact the nearest one.

BULLETIN 20 contains the full facts about EASY-FLO and SIL-FOS. It makes clear why these alloys are being used today, in tremendous quantities throughout all industry. It also includes useful information about joint design and fast brazing production methods. Write for a copy.

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ORIGINATORS OF EASY-FLO & SIL-FOS

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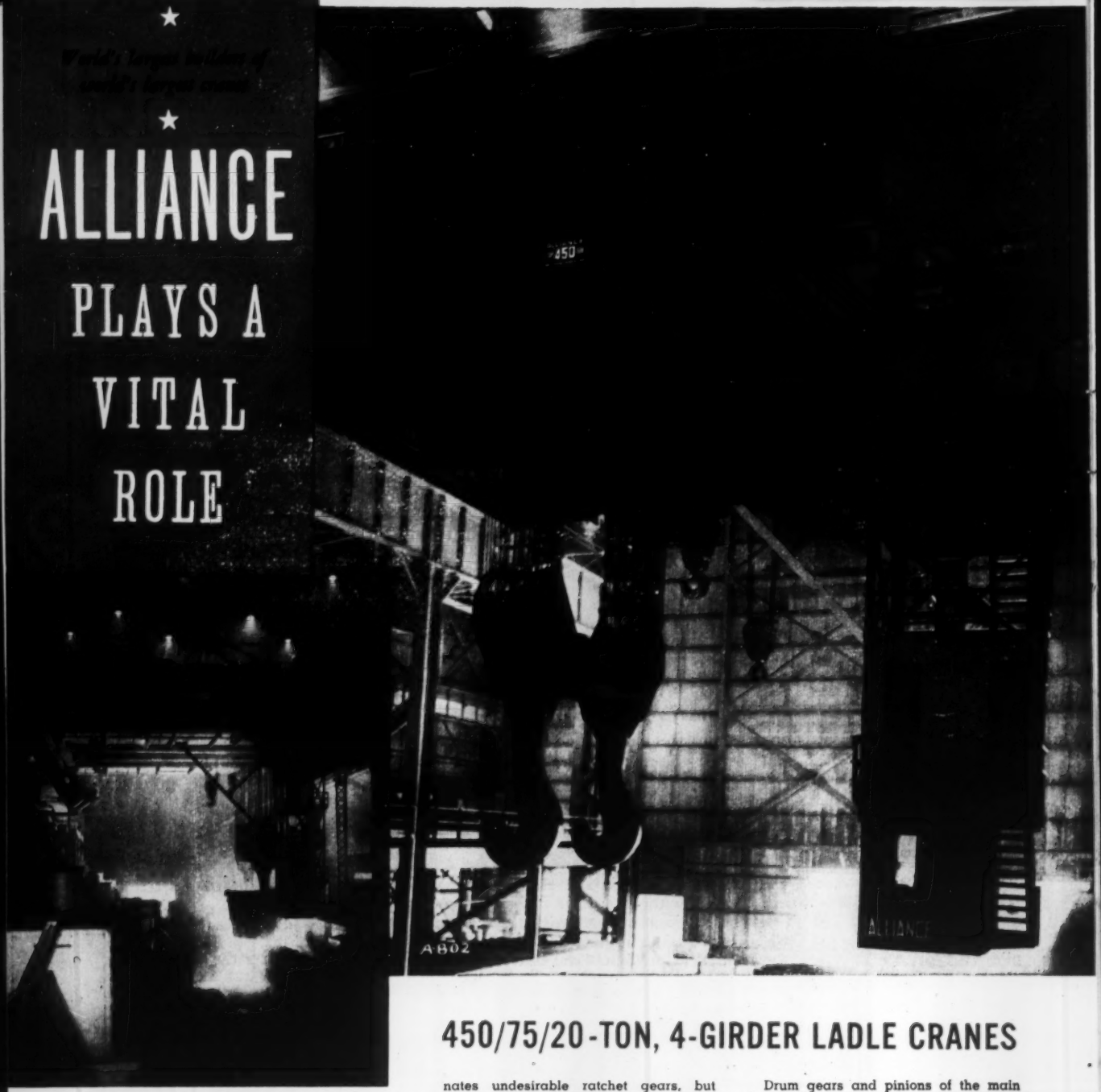
World's largest builders of world's largest cranes

ALLIANCE PLAYS A VITAL ROLE



450/75/20-TON, 4-GIRDER LADLE CRANES

When the engineers from the Construction Engineering Bureau of the United States Steel Corporation were in the market for the world's largest ladle cranes for Fairless Works, they consulted The Alliance Machine Company, whose experience and know-how qualified them for this important task.

One of the cranes Alliance designed, which is now operating in the Fairless Works, is this 450-ton ladle crane. Having a 69'6" span, this crane is equipped with a 2-motor, synchronized worm drive and double-drum interlocked type main hoist. The synchronizing shaft employed in the gearing scheme not only eliminates undesirable ratchet gears, but makes possible an additional safety feature in case one hoist motor fails. Under this condition, both worms are driven by the remaining motor. All gearing functions continue as though operated with two motors. In case of hoist motor failure on the conventional drive **without** the synchronizing shaft, hoisting is accomplished by **only one** set of gears, thus imposing a double load on active gearings, as the second drum is then driven through interlocking drum gears.

Hoist gearing is so proportioned that full crane capacity can be lifted by one motor without exceeding the quarter-hour rating.

Drum gears and pinions of the main hoist have precision-cut, single-helical teeth. This feature, in cooperation with the worm drive, provides vibrationless operation on either high- or low-speed hoisting and lowering.

All gears of this new Fairless Works crane are fully enclosed and operate in a bath of oil, assuring long life and low maintenance. The 4-part safety rope system affords the highest degree of safety in rope reeving.

This crane is equipped with a 5-story cab, the operator's compartment being air-conditioned.

Consult Alliance Machine Company engineers when you have a heavy material handling problem.

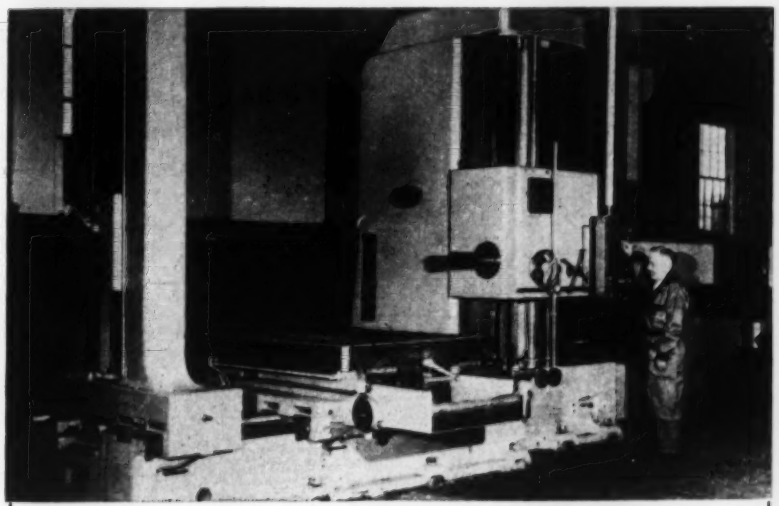
THE *Alliance* MACHINE COMPANY

MAIN OFFICE
ALLIANCE, OHIO

PITTSBURGH OFFICE
1622 OLIVER BUILDING, PITTSBURGH, PA.

NEW PRODUCTS and equipment

Reply card on page 191 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.



Machine Has Simplified Control

The outstanding feature of the Model 75 table type horizontal boring, milling and drilling machine is its pendant control. All functional controls are operated from a movable pendant station (directional feed and traverse control of the spindle, head, table and saddle, selection of feed and speed rates, spindle direction of rotation and head binders). The operator actuates directional levers for any required feed and traverse motion.

Screw or rack feeds for the spindle make possible a smooth, steady power feed for boring, as well as a sensitive hand feed action for small drilling and tapping. Type of feed is chosen from a selector switch on the front of the head.

An optical measuring device enables the operator to quickly and accurately set the head or table to any desired position.

These machines are available in 3, 4 and 5 in. diameter spindles with a wide range of head post heights, bed lengths and table sizes.

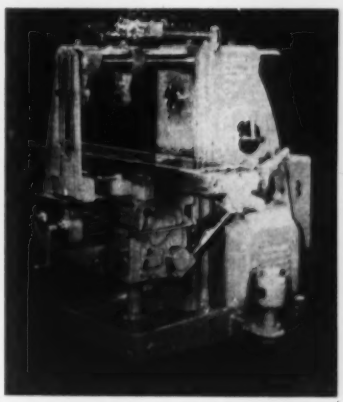
Standard features include feeds in inches per revolution and inches per minute for all motions, automatic depth knockout for spindle, hydraulic counterbalance for head and massive rear post for supporting extension boring bars. Accessories available as extra equipment include continuous feed facing heads, right angle milling attachments, thread cutting attachment, coolant system, etc. Bullard Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

Milling Machine

. . . plain and universal

The Model CE has been designed to offer efficiency, ease and economy of operation. It is immediately available in No. 2 (3 hp) or No. 3 (7½ hp) sizes. Both



sizes feature sixteen quick-change speeds (25 to 1300 rpm) and feeds (½ to 25 rpm).

This machine is especially suited for small shops, repair and maintenance shops and vocational training schools. Kearney & Trecker Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

Holding Device

. . . air powered

Vi-Speed Autovise, Model 633, has 6 x 6 in. jaws backed with a 4¾ in. diameter push rod. They may be used in any position and are especially adaptable for milling or holding for drilling and tapping. They are suitable for use as a bench type platen press.

Jaws open to 8 in. on standard units. Larger openings are available. They are powered by spring return air cylinders with 19:1 ratio on any line pressure to 150

Indicating Gages provide a quick, inexpensive method of checking workpieces . . . Here, a Federal gage checks minimum radius distance between shroud ring slots for a jet engine.

When all is said and done

WHICH GAGE MANUFACTURER has consistently produced the most complete line of modern gages?

Ever since Federal offered its first Dial Indicator, 37 years ago, this company has consistently lead the way in improvements, new instruments, and new methods of gaging. First to realize the value of Quality Control by Statistics, Federal was also first to promote its use by educating manufacturers all over the country in its application.

On the other hand, Federal has consistently weighed new ideas and rejected hundreds that would not stand up to requirements which proves that not all new ideas are practical ideas.

Federal concentrates on the design and manufacture of dimensional gages — not only a wide variety of Indicator Gages but also the most advanced type of Air Gages, Electric, and Electronic Gages — for continuous measuring, automatic sorting, and automatic dimensional control of parts produced on machine tools.

Our new booklet "A Management Blind Spot" reveals unappreciated shop situations and tells how they can be corrected. For your copy, write

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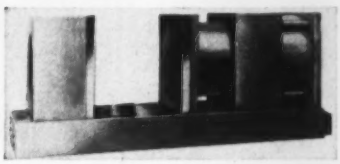
Dial Indicating, Air, Electric, or electronic — for inspecting, measuring, sorting, or automatically controlling dimensions on machines.

NEW PRODUCTS and equipment

psi, with 3 in. air stroke. The stationary jaw is adjustable to three positions for holding materials up to 8 in. in width. Jaw



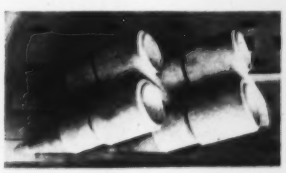
faces are removable and can be drilled and tapped for attachment of fixtures and dies. The jaws are available on 30-day free trial. Van Products Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Dust Collector

. . . mechanical

A secondary circuit keeps the discharge from small cyclones under constant negative pressure. This prevents recycling of dust in the primary system. Collection efficiency for dust particles is in



the range of 0 to 15 microns.

The units are cast from a highly abrasion-resistant gray iron. They are secured to the housing by a single bolt and nut. Collection efficiency is only slightly affected by variations in gas volume. Aerodyne Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 4

Lubrication System

. . . air operated

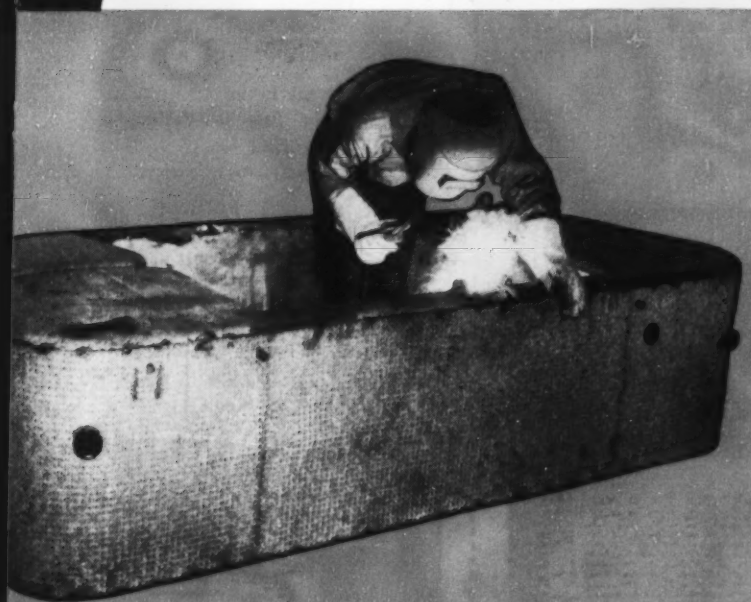
Automatic application of fluid lubricants to bearings on industrial machines (at predetermined intervals) is provided by this centralized system. It is intended to meet the need for servicing machines operating at varying speeds where applications of lubricant at varying intervals may be required. It permits interchangeability of machine units without disturbing the lubrication system.

Control may be mechanical, electrical or manual. The system includes an automatic safety con-

SNYDER TANK CORPORATION REPORTS...

J&L Junior JAL-TREAD

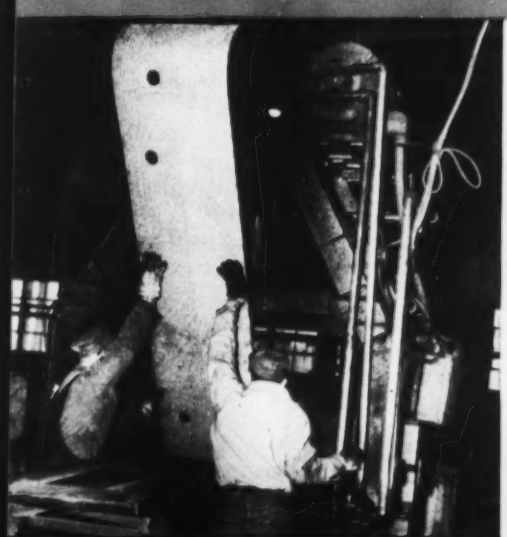
Fabricates easily, economically
Provides neat, safe walking surface



Snyder Tank Corporation of Buffalo, New York, recognizes the importance of a safe footing for truck drivers when they climb into the cab or adjust the hitch. That's why, for almost ten years, the top surface of Snyder gasoline truck tanks has been made of non-slip J&L Junior Jal-tread floorplate.

Referring to the use of Junior Jal-tread on late model trucks where fuel tanks replace running boards, E. F. Olson, Sales Manager, says, "It is important to have a safe walking surface here also, because the driver must enter and leave the cab by stepping on the tank. From a customer point of view, the plate (J&L Junior Jal-tread) is neater looking too."

Regarding production costs Francis Snyder, Plant Superintendent, reports that he has less trouble fabricating J&L Junior Jal-tread than other types of steel. He adds that Jal-tread's straight line pattern of raised cleats cuts spoilage and makes fabricating, forming, punching and bending easier.



see our catalog in SWEET'S

Whatever your application in new construction, new equipment or replacement jobs, you'll find that J&L Jal-tread and Junior Jal-tread offer floorings that are long-lasting, safe, neat, easy-to-clean and easy-to-fabricate. Check the advantages of Jal-tread, the only true checkerboard floorplate, today.

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J&L STEEL

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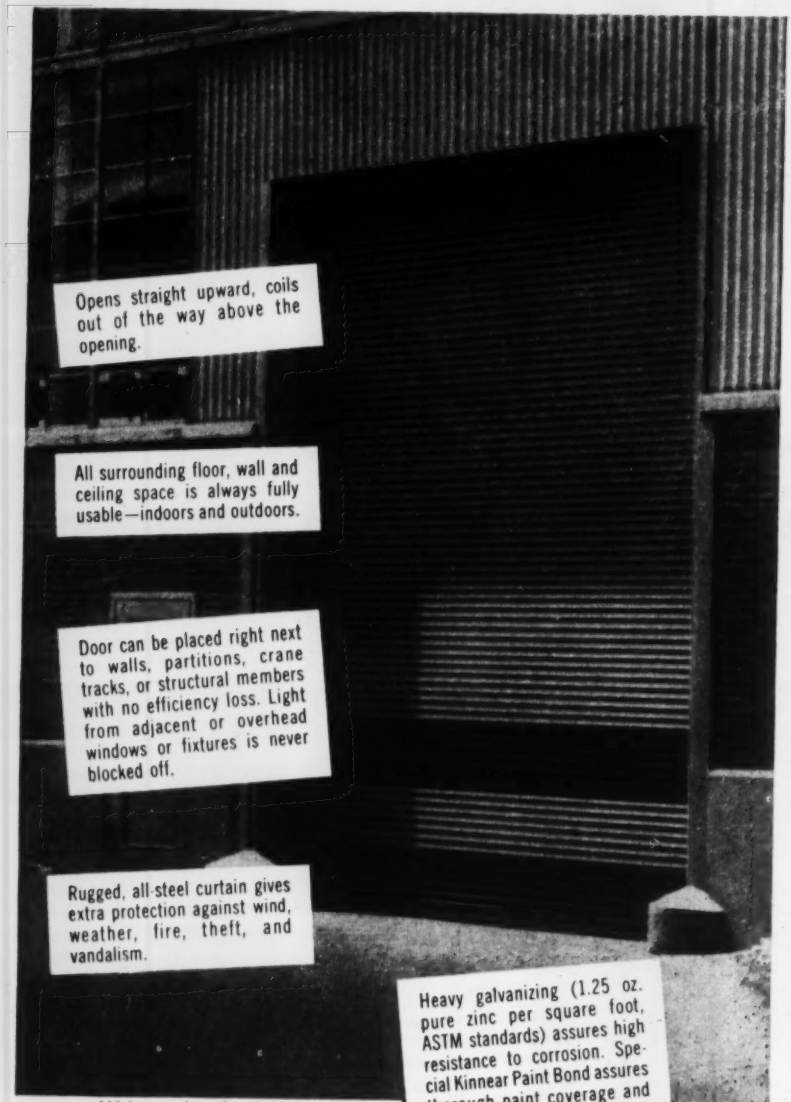
Steel Rolling Doors


Opens straight upward, coils out of the way above the opening.
All surrounding floor, wall and ceiling space is always fully usable—indoors and outdoors.
Door can be placed right next to walls, partitions, crane tracks, or structural members with no efficiency loss. Light from adjacent or overhead windows or fixtures is never blocked off.
Rugged, all-steel curtain gives extra protection against wind, weather, fire, theft, and vandalism.
Heavy galvanizing (1.25 oz. pure zinc per square foot, ASTM standards) assures high resistance to corrosion. Special Kinnear Paint Bond assures thorough paint coverage and lasting paint adhesion.

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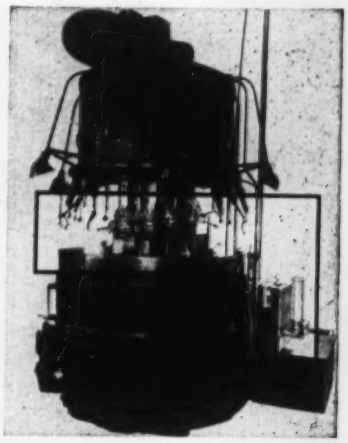
Saving Ways in Doorways
KINNEAR ROLLING DOORS

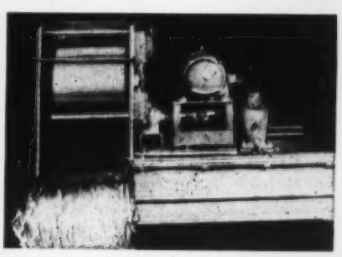
trol which stops the machine if the air supply to pump fails, lubricant reservoir is empty or a lubricant supply line is damaged. Lincoln Engineering Co.



FOR MORE DATA CIRCLE REPLY CARD NO. 5

Scrap Baller
. . . portable

The handler can be used as an independent unit or integrated on a slitting line. It occupies a space of about 4 x 7 ft and does not require a floor anchor. It is powered by a 2 speed, 5 hp motor, which operates the mandrel at speeds of 25 or 50 rpm.



It converts mill side trimmings into balls weighing from 200 to 700 lb, depending on the type and size of scrap and how well it winds on the mandrel. Phillips Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 6

Air-Mechanical Gage
. . . close tolerance checks

A dial indicator gaging unit checks the concentricity of the large counterbores. The mutual axis of the main bearings is in refrigerator compressor cylinder housings. The air unit, a 5000 to

MUSCLES OF STEEL

put the mules out of business

Oldtimers in coal mining can remember when mule-power was the only means of transportation in the mines.

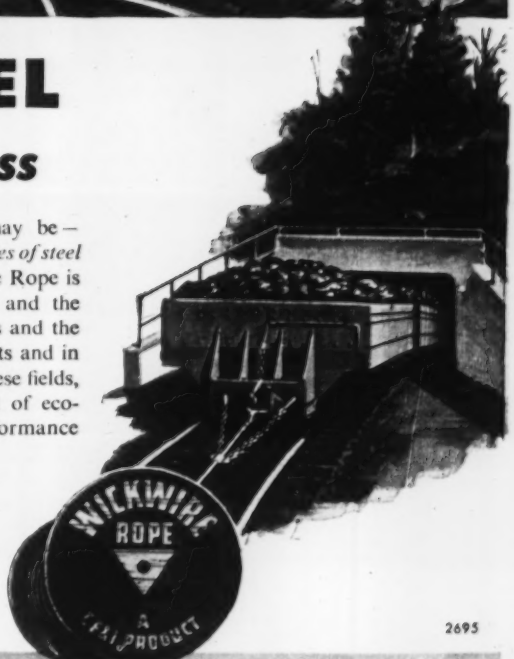
Today's efficient coal mining demands big-capacity mechanized equipment. In modern underground mines, wire rope serves as *muscles of steel*—pulling cars from the loader to discharge point. In strip mining, also, wire rope provides the *muscle* for huge stripping shovels.

No matter what the job may be—wherever there's need for *muscles of steel*—it's a safe bet that Wickwire Rope is busy at work. In the mines and the quarries. In the logging camps and the oil fields. With the fishing fleets and in materials handling. In all of these fields, Wickwire Rope has a record of economical and dependable performance that can't be beat.

every industry benefits from wire rope

WICKWIRE ROPE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION



2695

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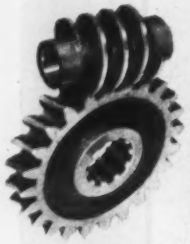
☑ **MASS PRODUCTION ECONOMY**—Large or small, you get the benefits of high production rates and big volume output at FAIRFIELD—the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY!

☑ **QUALITY PLUS**—There is no finer recommendation for the quality of the product you sell than to be able to say that it is "EQUIPPED WITH FAIRFIELD GEARS!"



☑ **DEPENDABLE SOURCE OF SUPPLY**—For more than thirty-five years, Fairfield has served as a dependable, efficient supplier of precision-made, automotive type gears for leading builders of construction, agricultural, industrial, marine, and automotive equipment.

☑ **COMPLETE PRODUCTION FACILITIES**—Fairfield offers unexcelled facilities in a new and ultra-modern plant for producing finest quality Spur, Herringbone, Spiral Bevel, Ground Tooth Spiral Bevel, Straight Bevel, Coniflex Bevel, Hypoid, Zerol, Worms and Worm Gears, Splined Shafts, and Differentials to your specifications.

☑ **ENGINEERING SERVICE**—Fairfield engineers are qualified to make expert recommendations on your gear production requirements. Take advantage of the service offered. *Your inquiry will receive prompt attention.*

FAIRFIELD MANUFACTURING CO.

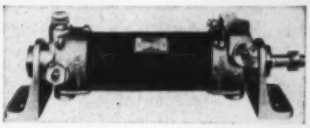
2313 South Concord Road • Lafayette, Indiana

Fine Gears Made to Order

Send for a copy of this illustrated bulletin describing Fairfield's facilities for making gears.

NEW PRODUCTS and equipment

1 magnification Dimensionair, checks the squareness of the cylinder bores with the axis of these bearings. For both inspections the bearing axis serves as reference. After the square checks have been made, the mandrel locks are released and the dial indicator



concentricity unit is moved into position. Minimum and maximum indicator readings are observed.

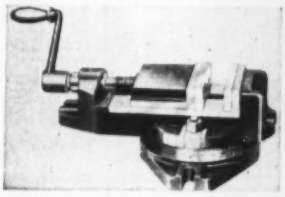
The high sensitivity of the 5000 to 1 Dimensionair, combined with reference provided by the precision mandrel and V-blocks, are said to give the gage exceptional accuracy. Federal Products Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 7

Screw Swivel Vise

. . . graduated base

It is, for milling machines, shapers and drill presses. Patented covers prevent chips from falling into swivel slide. Hardened and ground removable jaws and semisteel castings increase its strength.



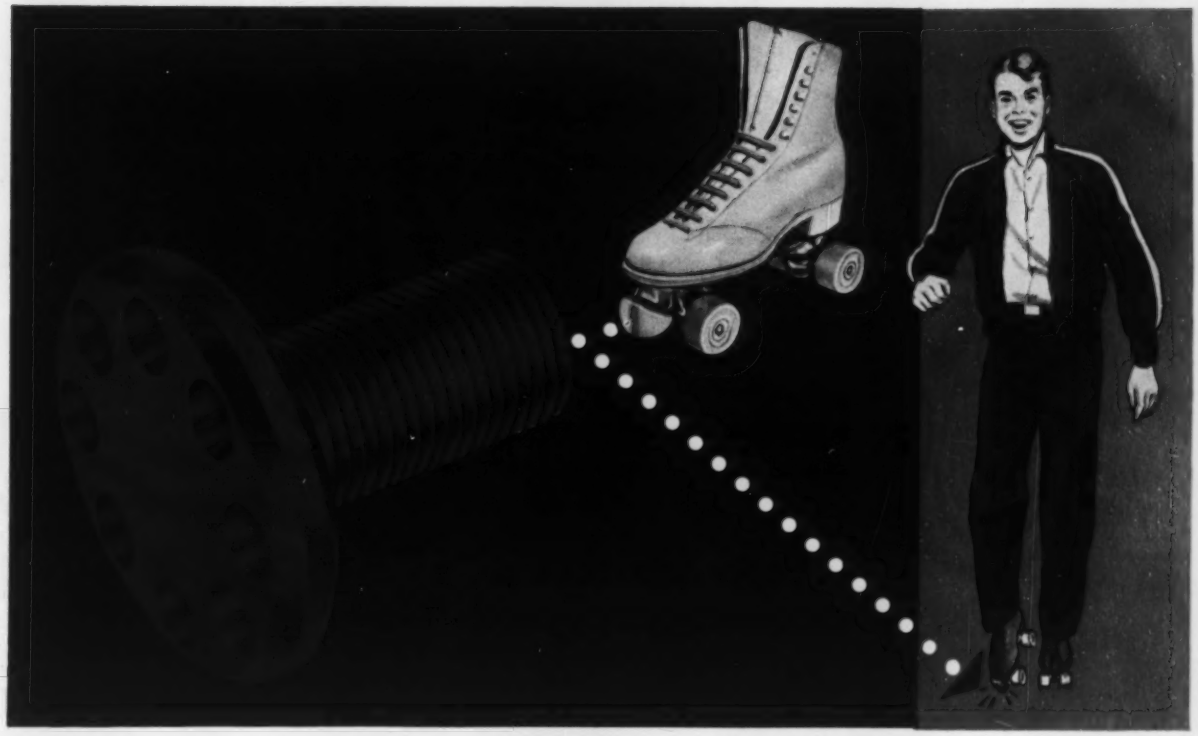
It is available in these jaw dimensions: Width 4 in., depth 1½ in., maximum opening 3 in.; width 6 in., depth 2¼ in., maximum opening 5¾ in.; with keyways ⅝ in. wide, ⅛ in. deep. Special jaws are available. Modern Tools Division, Nelco Tool Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

Spray Painting Machine

. . . for use on flatware

The rotary spray machine consists of four rotating arms mounted on a revolving vertical spindle. An automatic spray gun is mounted on each of the arms and travels in a circular path above the conveyor (its diameter is about



REYNOLDS ALUMINUM SCREW MACHINE STOCK

gives roller skate toe stop strength without weight

The screw machine part above is made by Ware Brothers Division of Chicago Roller Skate Company . . . manufacturers of quality skates for professional and amateur use. This toe stop takes plenty of punishment but aluminum screw machine stock from Reynolds offers ample strength and mass . . . yet is light in weight—the perfect combination for this part.

The manufacturer says, "We are currently blanking and threading this toe stop part of Reynolds 2011-T3 aluminum rod on automatic screw machines and drilling the holes on drill presses. As production increases all operations will be performed on the automatic screw machines. We also use a forged aluminum foot plate in this skate."

Consider the many advantages of aluminum screw machine stock from Reynolds. Job for job, aluminum alloys machine at greater speeds and feeds. This means a step up in production. And your unit costs for material, handling and shipping step down because strong, lightweight aluminum gives you *three times the number of pieces per pound.*

For assistance on correct alloy selection and prompt delivery on aluminum screw machine stock plus design and fabrication engineering service, call your nearby Reynolds office or distributor listed under "Aluminum" in your classified telephone directory. Write on business letterhead for your free copy of the 124-page handbook "Machining Aluminum Alloys", and an index of other Reynolds literature. *Reynolds Metals Company, 2520 South Third Street, Louisville 1, Kentucky.*

Quotation Accepted
You can increase your sales and save your customers money if you submit alternate quotations based on aluminum when other materials are specified.

See "Mr. Peepers", starring Wally Cox, Sundays on NBC-TV

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND • *Nearby Distributors Listed on Following Page*

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On the job... but not on the payroll. That's the way we would like you to think of our warehouse services. Whenever we can, we will give you the help you need on production problems, backed by Reynolds technical service men in the field and the fully integrated staff at Reynolds home office. Let us show you how our services can solve some of your problems, and, at the same time, save you money.

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You get fast delivery on both your "rush" orders and regular shipments. This helps you keep production on schedule . . . eliminates costly delays waiting for mill shipments.

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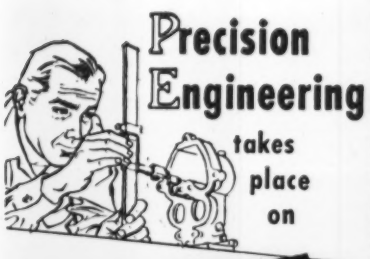
REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND



Precision Engineering takes place on

CHALLENGE® Precision Equipment

For LAYOUT, INSPECTION, CHECKING, LAPPING, ASSEMBLY AND WELDING

CHALLENGE Semi-Steel LAYOUT SURFACE PLATES

High compressive strength · · · *Low* coefficient of expansion. 16 standard sizes, 6" thick - other sizes to order. Also available for sectional assembly into unlimited sizes. Precision ground or planer finished.

CHALLENGE WORK BENCHES

Four sizes. Cast iron top, 2-in. thick. Welded steel supports, tool box shelf, steel drawer with pilfer-proof lock.

Other Challenge products include Clamp Edge Layout Plates · · · Reading Tables · · · Lapping Plates · · · Welding Tables · · · Surface Plates · · · Bench Plates and Surface Plate Equipment. The entire line is pictured and described in Challenge's latest catalog. Send for free copy, today!

Challenge

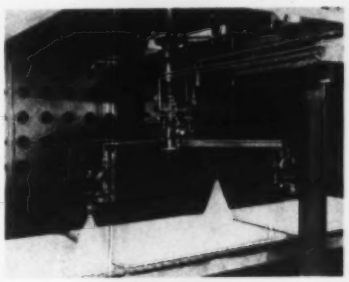
TRADE-MARK ® 769

THE CHALLENGE MACHINERY CO.

Office, Factories and Show Room: Grand Haven, Mich.

NEW PRODUCTS and equipment

24 in. wider than ware to be sprayed). The guns operate only when they are directly over the ware.



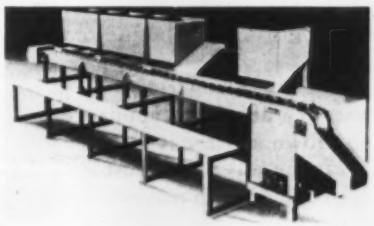
Coatings may be applied at extremely high conveyor speeds. The amount of finish is closely controlled by varying the speed of the rotary head. It is also available as a conversion unit. Binks Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 9

Conveyors

. . . self-contained

A self-contained assembly-conveyor equipped with bins for simplifying assembly of small components in large volume is illustrated. It is designed to use where small parts must be assembled in proper sequence with minimum effort and fatigue.



Bins are arranged in order, making parts convenient to the operator. The belt is equipped with studs over which the finished product is assembled. The conveyor is at table height. Sage Equipment Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 10

Duplicator Table

. . . of ribbed aluminum alloy

The tool gives full scale duplication of any shape, two or three dimensional, with a capacity up to 6 x 6 in. Built-in micrometers contribute to fast setup. De-

STAMPINGS

PILOT RUNS

SPECIAL METHODS PRODUCE SMALL QUANTITIES AT MINIMUM COST.

When you need just a few pieces — when you're still in the experimental stage—then an economical, cooperative source of parts is important.

Our **Machine-Cut Method** avoids custom die costs completely by use of special machinery which skillfully fashions pilot quantities.

Careful calculation determines the point at which labor costs warrant our **Short Run Method,** which uses simple contour dies and special purpose presses.

Best of all, when you get into large quantities on the experimental part, our STAMPINGS DIVISION is still your most economical producer, using our **Production Method.** Thus all three methods are at your disposal. And impartial choice of method *saves money* for you!

STAMPINGS DIVISION

LAMINATED SHIM COMPANY, INC.

3412 Union Street, Glenbrook, Conn.

Saved: $54,000 per year...

by converting from castings

to GEOMETRIC STAMPINGS

Stamping 57c

A large New England manufacturer called in Geometric engineers to study casting components of a new home appliance product. As a result the main casting shown above was converted to a stamping. Cost of the casting was $1.07, cost of the stamping only 57c—a savings of 50c on each part—or $54,000 saved per year.

If cost reductions like this make sense to you why not call in Geometric *now*—the earlier the better. There's no obligation and you may find substantial hidden profits—by converting from castings to Geometric Stampings.

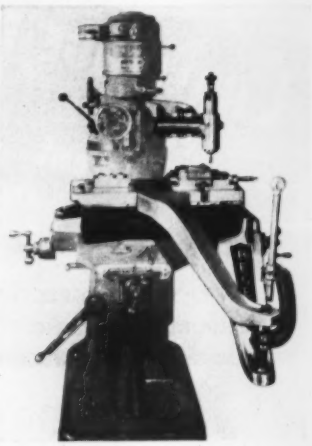
Send for free booklet on Converting from Castings to Stampings

GEOMETRIC STAMPING CO.

A Subsidiary of Barium Steel Corp.

1130 E. 200th Street **Cleveland 17, Ohio**

signed especially for the ½ and 1 hp models of the Bridgeport machines and for Index No. 55 millers, it is capable of duplicating parts with one setting. It can be handled by an inexperienced operator.



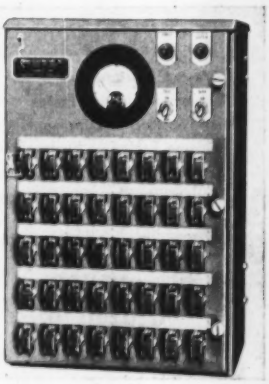
The table mounts on machine table with four T-bolts and moves on ball bearings running on hardened and ground raceways. It may be moved laterally in any direction, milling out the parts as a stylus follows the contour of the master mold, die or punch. Lateral motion is controlled by a single lever. J. M. Kalins & Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Monitor

. . . for bearing temperatures

For continuous monitoring of bearing temperatures, it consists of thermocouples installed at the points where temperatures are to be checked. A bank of magnetic



amplifiers magnify the electrical output of the thermocouple to ac-

Radiograph reveals several sand inclusions. These must be chipped out and repaired.

Later radiograph shows repairs have made the casting sound—saved the cost of re-casting.

RADIOGRAPHY

teams with Foundry know-how

to produce a sound high pressure valve body

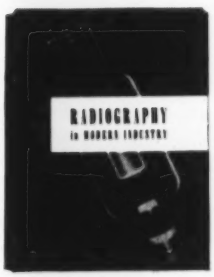
TO TAKE its place in a 300 psi system, this steel valve casting had to be sound. So, it was checked by radiography, revealing the presence of sand inclusions. These were chipped out and the necessary repairs made—a second radiograph showed a sound, homogeneous casting.

This is another good example of the way radiography is used to insure good work, avoid waste, and prevent service failures. It's another example of the way it can improve operations and increase business.

Perhaps you, too, can do this through the use of radiography. Talk to your x-ray dealer. Send for a free copy of "Radiography as a Foundry Tool."

RADIOGRAPHY

another important example of photography at work



RADIOGRAPHY IN MODERN INDUSTRY

A wealth of invaluable data on radiographic principles, practice, and technics. Profusely illustrated with photographs, colorful drawings, diagrams, and charts. Get a copy from your local x-ray dealer—price, $3.

EASTMAN KODAK COMPANY
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The village blacksmith did well enough forging the relatively few and simple products needed in his easy-going times. But it takes modern equipment and techniques to supply forgings that meet today's exacting standards for strength, uniform high quality and economical, high-volume production.

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West Coast Representative:
A. C. Stearns Co., 3911 San Fernando Road, Glendale, Calif.

tuate an indicator and alarm system.

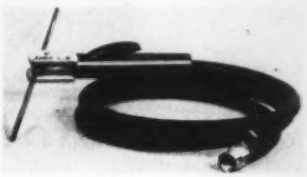
They are custom designed. The alarm point of each thermocouple is easily adjustable. Bogue Electric Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 12

Torch

. . . for cutting, gouging

Model G-2, designed for light work, uses electrodes up to ¼ in. in diameter. It operates from a dc welding machine and a compressed air line and removes defects in castings or forgings, cleans the roots of the welds and removes welds. It grooves, bevels or cuts mild steel, stainless steel,



hard alloys, brass, bronze, monel and cast iron. The groove left by the torch is ready to receive the weld without further preparation.

The torch features a rotating nozzle, which permits changing the electrode angle to suit the job, but maintains the air jet in alignment. Air and current are brought to the torch through a concentric cable. Depth of cut is easily regulated. Welding slag does not deflect or hamper the cutting action. Arcair Co.

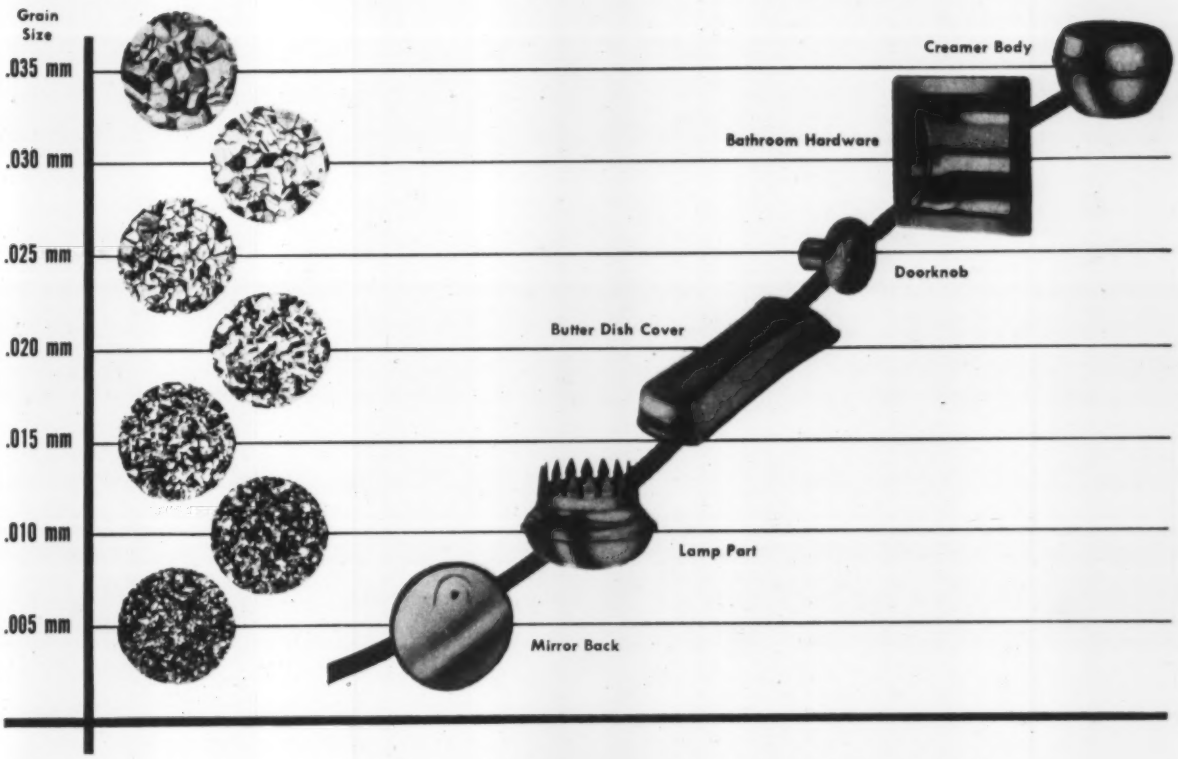
FOR MORE DATA CIRCLE REPLY CARD NO. 13

High Vacuum Furnace

. . . for melting, casting

Metal producers can use it to investigate the effect of high vacuum processing on old and new alloys, with emphasis on high temperature types. A two stage diffusion ejector pump creates low pressures required for gas-free atmosphere and provides capacity for handling the pressure surges occurring during alloy additions and pouring.

All vacuum line valve are pneumatic. A roll-away chamber cover contains the molds and lead-thrus for a mold heating source. The induction heating unit is mounted



Which is the RIGHT Fine Grain Brass for a Job?

Write for a free copy of Bridgeport's folder on Grain Size— "The Fourth Dimension."

High finish on decorative brass can be produced at much lower cost by using a fine grain metal. But severe cupping, drawing and forming operations require ductility which decreases, generally, as grain size gets finer.

The right metal for the job, then, is often a compromise between fineness of grain and ductility: *no one fine grain brass can do all jobs well.*

By offering a *range* of grain sizes, Bridgeport can supply you with the *right* fine grain brass for every application, assuring you optimum production at lowest costs.

Bridgeport Technical Service will be glad to work with you in finding the right brass for your product if you will contact them through your local Bridgeport Sales Office.

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Serving Industry With a Nationwide Network of Conveniently Located Sales Offices and Warehouses
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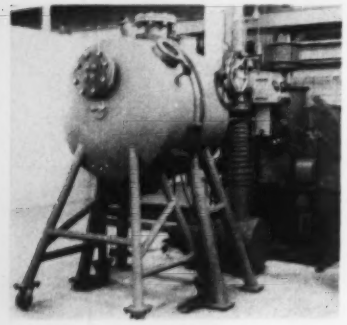
in the permanent portion of the furnace chamber. There is a choice of five crucible sizes to accommodate melts of 5, 12, 17, 30



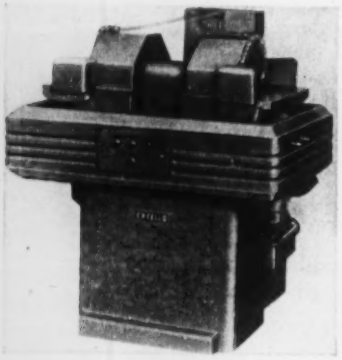
and 50 lb. Three high frequency power supplies are adaptable to this furnace—4200 cycles per second is recommended for general use. Consolidated Vacuum Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

Tool Grinders

. . . two types

Style 46-D is a general-purpose grinder using 6-in. plate type wheels for face grinding. It has inbuilt motor spindle which is permanently lubricated. Coolant flows by gravity from a reservoir above the spindle. Tool rest table and spindle are at a convenient height to minimize operator fatigue.



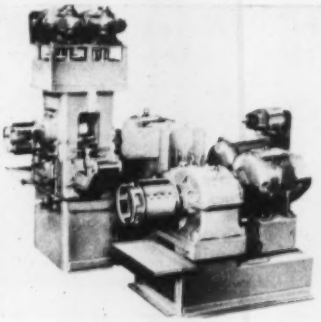
Style 49-A (illustrated) is a heavy-duty model. It uses 14-in. wheels for fast sharpening of large tools and rough-grinding smaller sizes. The pressure coolant system has individual control valves at each side of each wheel. A coolant settling tank has been added. Ex-Cell-O Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 15

Rolling Mill

. . . four-high

Designed to handle narrow strip up to 8 in. wide, this mill will roll material from 0.060 to 0.001 in. thick, holding a gage tolerance of plus or minus 0.0001 in. Materials rolled range from soft copper to stainless steel. Heavy housing and small diameter work rolls, together with accurate back tension and rewind tension control, make close tolerance work possible.



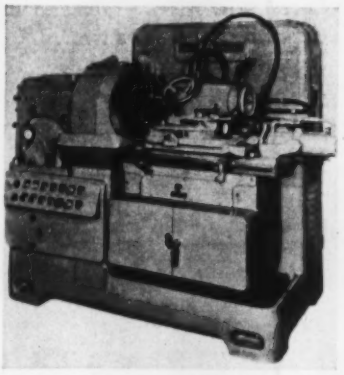
The mill is featured as a package unit for one-way or reversing operation. It is completely self-contained and offered with or without motorized screwdown. Speeds range up to 500 fpm. H. J. Ruesch Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 16

Gear Shaving Machine

. . . cuts loading time

An improved Model GCR Red Ring internal gear shaver features an air cylinder and hand-



wheel controls. It is designed for precision shaving operations on internal spur and helical gears from 3 to 12 in. pitch diameter.

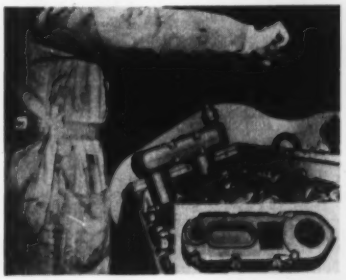
A new cutter head and slide design includes an air cylinder control that provides fast advance and retraction of the cutter head to facilitate loading and unloading of gears from the workhead. A handwheel at the front of the cutter head allows the operator to advance the cutter with one hand while orienting it into mesh with the work gear with the other. National Broach & Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 17

Torque Multipliers

. . . power ratio of 12:1

Model 104 Powerench is built on a pinion and ratcheting gear segment principle. It is manually operated with a work handle or tension indicator. It has a working load output of 7000 ft lb and is strength tested to 10,000 ft lbs.



The 29½-lb unit employs a ¾-in. square female input and 1½-in. square female output. Special anchoring devices necessary to position the Powerench and to anchor the torque reaction are available to fit the desired application. Used with a tension indicator, it assures accurate torques with a minimum of time and effort. B. K. Sweeney Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 18

Pressure Sensitive Tapes

. . . die cut

These tapes have been developed to mask out unusual shapes or to protect holes and apertures

during manufacturing. They are cut to specification. Masks are supplied in rolls and are mounted

THE BURLINGTON LIARS' CLUB
SPINS A YARN FOR **BAKER'S MAGDOLITE**

Off and Flying!

Back in the hills of Montana it really gets cold at times, but it has never been as cold as it was last winter. The mercury dropped clean out of sight. Old Zeke had a cuckoo clock that had always kept perfect time through all kinds of weather . . . but when this cold spell hit, strange things began to happen. After a day of the hard, biting cold, the cuckoo quit coming out. On noon of the third day the door cracked open . . . the cuckoo stepped out, stuttered "Goodbye" to Zeke through his cold and chattering bill, then took off and joined a flock of ducks who passed by heading south.

You won't be left out in the cold for a dependable source of dolomite if you order BAKER'S MAGDOLITE, the original dead-burned dolomite. The J. E. Baker Company has three plants, located in York and Billmeyer, Pennsylvania and Millersville, Ohio. These plants have an ample supply of BAKER'S MAGDOLITE on hand . . . assuring you always of prompt service. Remember, BAKER'S MAGDOLITE is five ways better . . . Composition, Preparation, Strength, Economy, Quality.

JEBCO

PRODUCTS
SINCE 1889

MAKERS OF BAKER'S MAGDOLITE

7-54

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THE J. E. BAKER COMPANY
YORK, PENNSYLVANIA
Plants: York, Billmeyer, Pennsylvania—Millersville, Ohio

SHENANGO Centrifugal CASTINGS ... KEY TO SAVINGS

Centrifugally cast of gun metal bronze, these double-flanged lift cylinder bodies are finish-machined by skilled workmen in the modern Shenango plant.

"Thumbs Down" on overhead

when you specify SHENANGO

THESE double-flanged bronze lift cylinder bodies are typical Shenango made-to-order centrifugally cast parts . . . made-to-order, too, in cutting overhead and reducing cost.

High strength Shenango castings keep part failures, work stoppage, and downtime to a minimum. With centrifugal castings, no more blowholes, sand inclusions or other costly defects.

Exactness is another important Shenango factor that will reduce your overhead. Up-to-date facilities and experienced workmen produce precision-machined parts that exactly meet your specifications. No more time and money lost to parts that *nearly* fit.

Write to Shenango for more information and bulletins on reducing YOUR overhead. Address . . .

SHENANGO-PENN MOLD COMPANY
Centrifugal Castings Division
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO
COPPER, TIN, LEAD, ZINC BRONZES · MONEL METAL
ALUMINUM AND MANGANESE BRONZES · NI-RESIST · MEEHANITE METAL

NEW PRODUCTS and equipment

on quick release paper backing.

Die-cut circles (flash-off masks overlapping each other slightly on the roll) are available as stock items. Stock diameters range from ¼ to 1½ in. circles. Sizes from 20 x 40 in. down can be furnished in irregular shapes or sizes. Printed Cellophane Tape Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 19

Electric Drills

. . . portable

Model 75 and Model 78 (below) are featured items. The manufacturer reports the drills have 55 per cent more power than former mod-

els and are lighter. Model 75, a heavy duty tool, is available in optional speeds. Model 78 is a standard duty drill for steel up to ⅜ in., for wood up to ⅝ in. Skil Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 20

Solvent

. . . prepares for painting

It removes rust, scale, lime and corrosion from metal and other surfaces. At the same time, it strips light oil, grease and dirt films but does not attack gaskets or rubber or metal parts. It will etch and neutralize alkali of fresh concrete to make for good paint adhesion. It is safe to handle and does not give off dangerous fumes.

The solvent may be applied with swab, spray method or circulating dip tank. Brulin & Co. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 21

FREE LITERATURE

Catalogs and Clip Sheets

Use these reply cards to bring you free literature, clips or more information on new products and equipment described or advertised in this issue.

Torque Tools

Jo-Line Tools Inc. offers a description of its precision torque limiting wrenches and accessories —20 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 22

Roller Bearings

Rollway Bearing Co. Inc. introduces the formula of the Anti-Friction Bearing Mfg. Association for load rating and the method of calculating expected minimum bearing life. An alignment chart is included—Catalog TR-854-DC, 36 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 23

Machine Tools

Cincinnati Milling Machine Co. lists design highlights and benefits, functional diagrams and specifications of its Toolmaster milling machine—Catalog M-1870, 19 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Comparison Chart

Chicago Latrobe's quick reference chart lists over-all, flute and assembled drills with utility or split sleeves.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

Brake Manual

O'Neil-Irwin Mfg. Co. illustrates how a single Di-Arco brake can be converted into a bar folder, tab former, radius former, open end brake, standard brake or box and pan brake by changing the top forming bar—16 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Boring, Drilling, Milling

Cincinnati Gilbert Machine Tool Co. has issued specifications and photos on floor type horizontal boring, drilling and milling machines—Bulletin 954, 14 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 27

Cables

Okonite Co. offers a description of its neoprene sheathed cable, which is made of Okolite-Okoprene and 0 to 5000-volt unshielded, rubber insulated—Catalog OK-1085, 128 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 28

Tractor

Allis-Chalmers Mfg. Co. tells the engineering, mechanical and operating story of its HD-9 diesel-powered crawler tractor—30 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Cores, Bars, Plates

Chrysler Corp.'s Amplex Division lists over 597 Oilite standard size cores, bars and plates—Catalog CB-54-1, 6 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Gear Hobs

Star Cutter Co. lists standard tolerances for gear hobs—Reference Manual SC-1, 8 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Ball Bearing Trolley

Link-Belt Co. offers application and maintenance information, plus a description of attachments commonly used with its ball bearing trolleys—Book 2536, 20 pages.

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Spectrograph

Jarrell-Ash Co. illustrates and describes its spectrograph (adaptable to all spectra) and order sorter—Catalog EB-10-54, 8 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

Hydraulic Cylinders

Vickers Inc. describes its compact hydraulic cylinders for general industrial application—catalog 54-68, 8 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 34

Maintenance

Anderson-Nichols & Co.'s "Get Better Maintenance" discusses the

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size and complexity of today's maintenance problems and the necessity of using a sound engineering approach—24 pages.

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Wire Rope

Macwhyte Co.'s "Macwhyte Safe-Lock Wire Rope Assemblies" shows terminals permanently swaged to bright or galvanized carbon steel, stainless and monel metal wire rope—Catalog 5201, 21 pages.

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Aluminum Designation

Peter A. Frasse and Co. Inc. offers a chart describing the new Aluminum Designation System developed by the Aluminum Association.

FOR A FREE COPY CIRCLE REPLY CARD NO. 37

Clamps

Adjustable Clamp Co. details its Jorgensen and Pony line of clamps. Styles and sizes are listed—Catalog No. 19, 32 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 38

Fluid Couplings

Twin Disc Clutch Co. gives complete installation and performance data on fluid couplings—Bulletin No. 144-D, 13 pages.

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Rolled Steel Rings

Edgewater Steel Co. describes and illustrates the process by which its rolled steel rings are formed from solid blocks of steel—12 pages.

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Casting Cleaning

American Wheelabrator & Equipment Corp. tells how to attain high cleaning rates in foundries producing large, heavy castings that will withstand tumbling—Bulletin No. 744-2.

FOR A FREE COPY CIRCLE REPLY CARD NO. 41

Epoxy Resin Adhesives

Armstrong Products Co. offers technical data and price information on its epoxy resin adhesives—16 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 42

Lighting

Sylvania Electric Products Inc.'s "Good Lighting is Good Business" covers the economics and mechanics of good office lighting—19 pages.

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Sweepers

Homer Mfg. Co. Inc. explains its permanent magnetic aisle and road sweepers—Bulletin MS-250, 4 pages.

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Metal Disintegration

Metalmaster Division, Clinton Machine Co., offers a brief pictorial discussion on how metal disintegration works. Applications and descriptions of several models are included.

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EDITORIAL REPRINTS:

Cast Ferrous Metals

Part IV, p. 158 covers what you can do about flaws. Their size, shape and distribution are vital service factors. Here are test techniques and welding procedures.

FOR A FREE COPY CIRCLE REPLY CARD NO. 46

Vinyl-Metal Laminates

When metal weds plastic a new material is born. Potential uses for the laminate can be found where the protection of vinyl plastic and rigidity of metal are desired. On p. 116 you'll find an application list.

FOR A FREE COPY CIRCLE REPLY CARD NO. 47

Europe's Metalworking

This begins (p. 84) a series of outlook articles on major European metalworking countries. Italy and Sweden report near-record steel output, high industrial activity in 1954. Outlook for 1955: Strong industries will continue to prosper as competition increases.

FOR A FREE COPY CIRCLE REPLY CARD NO. 48

Multipurpose Hot Mill

In the specialty steel business flexibility of equipment is a must. Here's a description of Carpenter Steel Co.'s new hot mill which is capable of rolling strip, coiled rods and round bars, p. 124.

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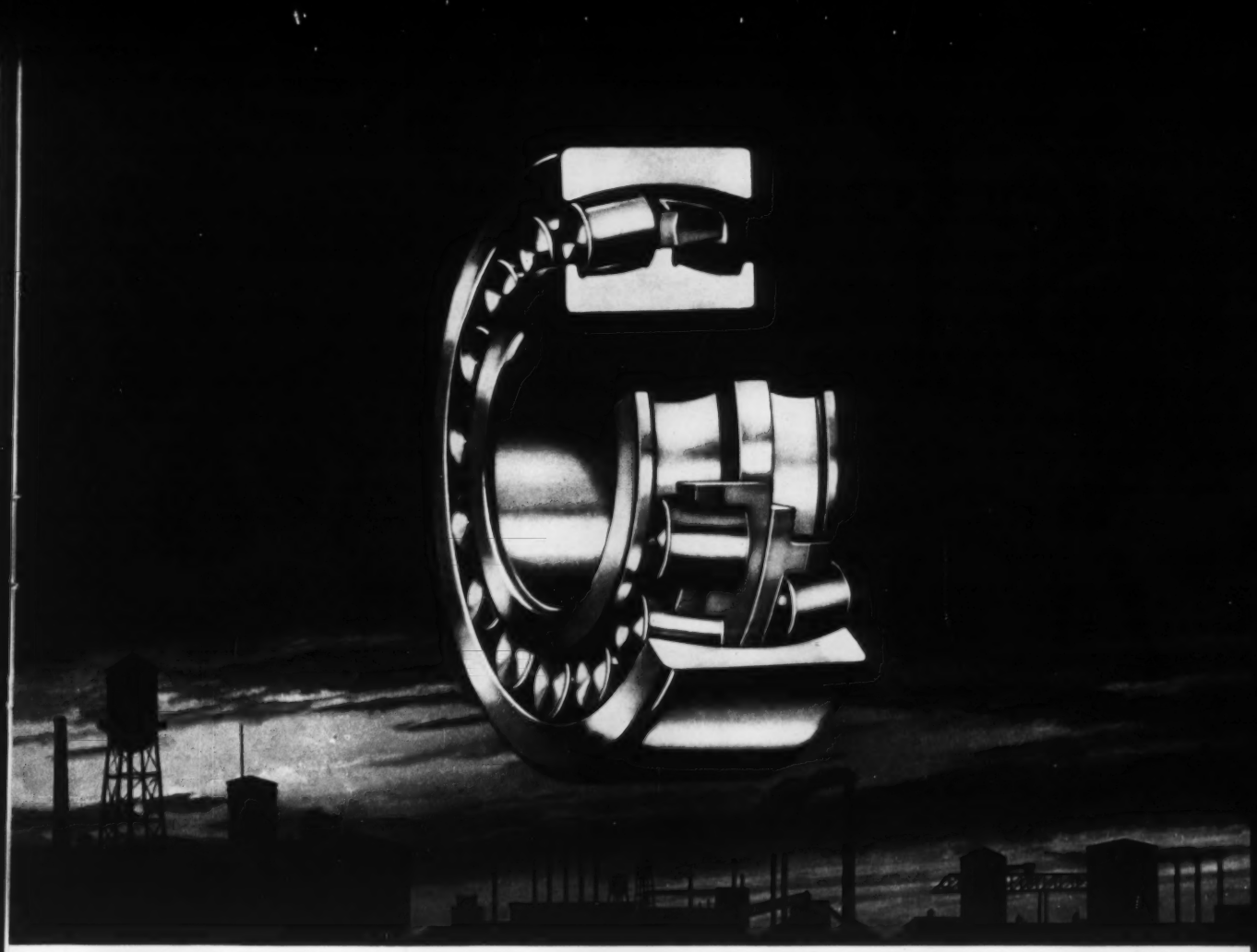
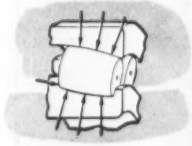


Why it pays to specify
TORRINGTON Spherical Roller Bearings

Uniform, close control of precision-ground contact surfaces—for even load distribution, maximum bearing life.



Accurate geometrical conformity between races and rollers—for ultimate capacity and performance.

Races and rollers heat treated according to the most advanced metallurgical procedures.

Machined, cast-bronze cages—one for each path of rollers—assure freedom of operation.

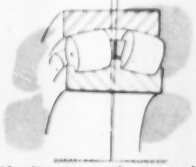
Integral center flange on inner race—to give positive radial and thrust stability—both essential to satisfactory performance.

Available from stock with either straight or tapered bore—for shaft or adapter mounting.

These are advantages that give you long, efficient, low-maintenance service in the toughest heavy-duty applications... **maximum value for your bearing dollar.** ***That's why it pays to specify TORRINGTON Spherical Roller Bearings.***

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.

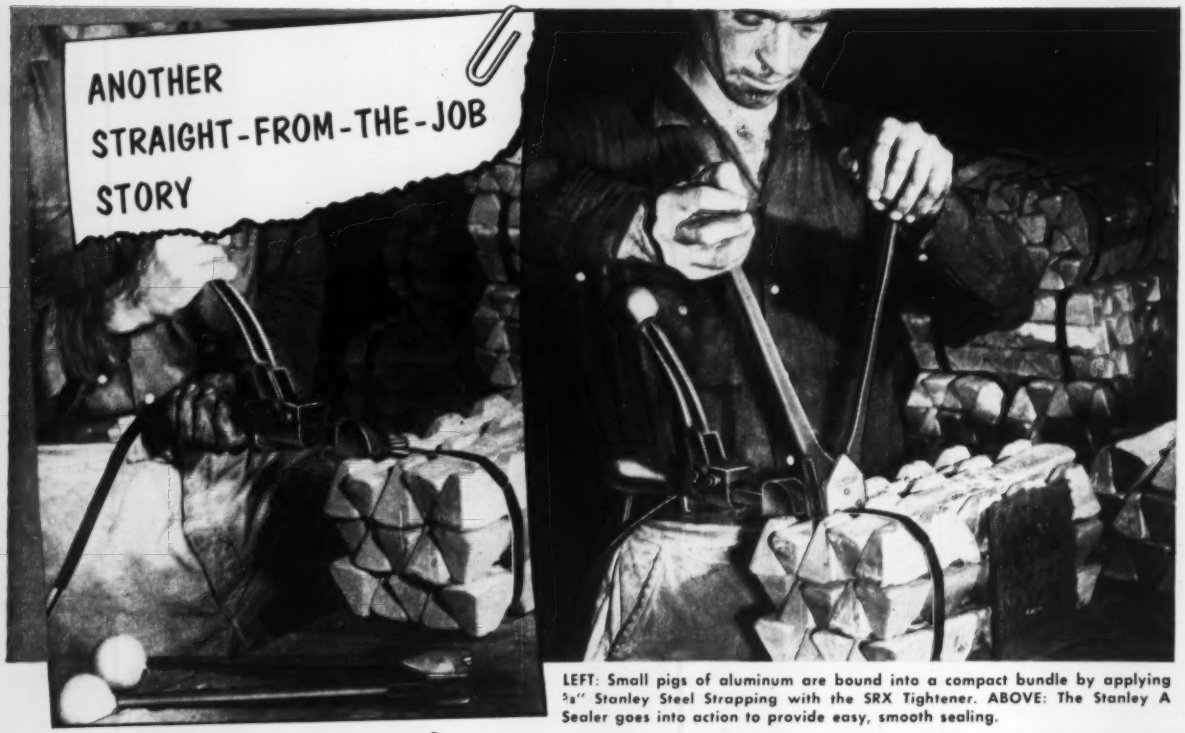
TORRINGTON SPHERICAL ROLLER **BEARINGS**



Self-aligning—for continuous, free-rolling service under shock loads and at sustained speeds.

Unit assembly—for easy, low cost handling.

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers



LEFT: Small pigs of aluminum are bound into a compact bundle by applying ⅝" Stanley Steel Strapping with the SRX Tightener. ABOVE: The Stanley A Sealer goes into action to provide easy, smooth sealing.

STANLEY®

STEEL STRAPPING

Saves Time and Trouble

ABOVE: The operator has tightened the first band of 1¼" Car Band around a bundle of heavy, odd-shaped, hard-to-pack ingots. He speedily seals the band, using the Stanley KNA Sealer. BELOW: A second strap of Car Band is applied with the Stanley TXN Heavy Duty Tightener to package the bundle securely.

"Uni-ties" aluminum pigs and ingots to speed handling and inventory for ABCO Smelting & Refining Co. and their customers.

Shipping pigs and ingots of refined nonferrous metals without strapping meant time-consuming, piece-by-piece handling by ABCO and made receiving and inventory difficult for their customers . . . until STANLEY STEEL STRAPPING TOOLS AND EQUIPMENT came to the rescue! Almost any product from ingots to engines can be moved, shipped and stored easier, faster and more economically by "Uni-tieing" in self-contained bundles, or on skids and pallets, with STANLEY STEEL STRAPPING OR CAR BAND.

Just what are *your* packing and shipping problems? High labor costs? Tight storage space? Damage in transit? Write for the free folder "Uni-tie Your Products . . ." that will supply many of the answers you're looking for. Then, follow through by inviting the Stanley Steel Strapping Specialist to call. He has *all* the answers!

Write For Free Folder "Uni-tie Your Products . . ."

STEEL STRAPPING DIVISION

THE STANLEY WORKS

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STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS
STANLEY STEEL STRAPPING • STANLEY STEEL

STEEL

December 6, 1954

Market Outlook

MOUNTING steel demand has pushed ingot operations to the highest point since mid-December of last year.

Last week the national operating rate hit 81 per cent of capacity, up 1.5 points from the preceding week. Indications are that still higher levels will be attained before year-end holiday curtailments check the uptrend. Particularly significant is the fact November was the first 8-million-ton production month in a year, and all the signs point to December output at not much, if any, under that figure.

FLAT-ROLLED LEADS—Requirements for flat-rolled products lead demand, but the bulge in mill bookings is not limited to cold-finished sheets for automobile assembly. In fact, with auto needs pretty well covered into first quarter, pressure is increasingly noticeable from other sheet consuming lines, such as appliances. This is being reflected in steadily lengthening deliveries on hot-rolled sheets, enameling stock, long ternes, electrical and stainless sheets.

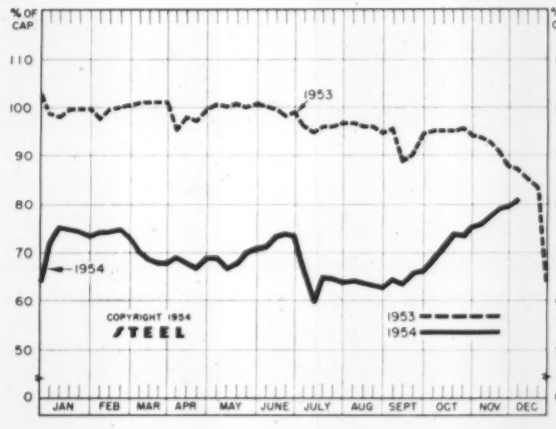
DELIVERIES EXTENDED—Shipment promises on cold-rolled sheets extend up to 10 weeks on the average, though some makers are virtually booked full for first quarter. Hot-rolled sheets and strip can still be had within four weeks, but long ternes are booked well into first quarter. Enameling stock and electrical sheet shipments range up to 10 weeks, stainless 8 weeks. Galvanized sheets are the most extended, running as far as 26 weeks ahead on the continuous hot-dipped grade. Some duplication of galvanized orders is showing up as supply becomes increasingly tight.

LEVELING OUT—Orders from the automakers may be expected to begin leveling out soon, following the buying splurge of recent weeks which resulted in boosting mill backlogs, notably in cold-finished sheets. Deliveries now extend well into first quarter. At the same time, construction steel procurement is slowing down seasonally. This is mirrored in slackening structural and reinforcing steel buying and the intensified sluggishness in plates. Construction requirements, nevertheless, still present imposing volume business, largely on public projects.

OUTLOOK PROMISING—If and when buying of flat-rolled products slows down early next year, as anticipated, the railroads may be expected to fill the resulting gaps in demand on the mills. The carriers, it is said, are likely to come into the market for substantial tonnages of rail, wheels, underframes, cars and other items requiring the heavy products. Ordinarily, the roads would be placing orders for 1955 at this season, but it looks as though such buying will not come out until January or February. To date, only seven carriers have bought against estimated 1955 requirements.

PRICES—In the face of steadily rising steelmaking operations, scrap prices declined for the second consecutive week. STEEL's composite on steelmaking grades last week slipped to $32.58 from $33.08, compared with $33.67 for the first three weeks of November. The decline is attributable to sluggish buying as the mills turn to increased use of hot metal from reactivated blast furnaces. Other composites are unchanged, with finished steel holding at $117.95.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Dec. 5	Change	Same Week 1953	Same Week 1952
Pittsburgh	78	+ 0.5*	77.5	103
Chicago	90	0*	97	108.5
Mid-Atlantic	72	0	90	101
Youngstown	86	+ 3	90	106
Wheeling	90.5	+ 11	91	100.5
Cleveland	91.5	+ 5*	93	108
Buffalo	100	+ 2.5	100	106.5
Birmingham	64	0	96.5	106.5
New England	70	+ 12	77	92
Cincinnati	71.5	— 4	71.5	93
St. Louis	83	+ 1	84.5	99
Detroit	80	0	101	106
Western	84	+ 1	90	107
National Rate	81	+ 1.5	87	105.5

INGOT PRODUCTION‡

	Week Ended Dec. 5	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	119.5†	119.2	113.4	122.8
NET TONS (In thousands)	1,919†	1,915	1,822	1,972

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

Metalworking Outlook—p. 65 Technical Outlook—p. 115

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 30 1954	Nov. 16 1954	Month Ago	Nov. Average
(1947-1949=100)	144.7	144.7	144.7	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 30

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525
Rails, light, 40 lb	5.917
Tie Plates	5.275
Axles, railway	7.500
Wheels, freight car, 33 in. (per wheel)	48.500
Plates, carbon	4.675
Structural Shapes	4.517
Bars, tool steel, carbon (lb)	0.430
Bars, tool steel, alloy, oil hardening die (lb)	0.525
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610
Bars, H.R., alloy	8.775
Bars, H.R., stainless, 303 (lb)	0.418
Bars, H.R., carbon	5.000
Bars, reinforcing	5.050
Bars, C.F., carbon	8.160
Bars, C.F., alloy	11.275
Bars, C.F., stainless, 302 (lb)	0.433
Sheets, H.R., carbon	4.880
Sheets, C.R., carbon	5.871
Sheets, galvanized	7.220
Sheets, C.R., stainless, 302 (lb)	0.548
Sheets, electrical	$9.350
Strip, C.R., carbon	7.507
Strip, C.R., stainless, 430 (lb)	0.415
Strip, H.R., carbon	5.125
Pipe, black, buttweld (100 ft)	15.000
Pipe, galv., buttweld (100 ft)	18.605
Pipe, line (100 ft)	146.804
Casing, oil well, carbon (100 ft)	154.216
Casing, oil well, alloy (100 ft)	227.875
Tubes, boiler (100 ft)	‡
Tubing, mechanical, carbon	‡
Tubing, mechanical, stainless, 304 (100 ft)	161.193
Tin plate, hot-dipped, 1.25 lb	8.533
Tin plate, electrolytic, 0.25 lb	7.233
Black plate, can making quality	6.333
Wire, drawn, carbon	7.938
Wire, drawn, stainless, 430 (lb)	0.545
Bale ties (bundle)	5.860
Nails, wire, 8d common	7.815
Wire, barbed (80-rod spool)	7.109
Woven wire fence (20-rod roll)	16.815

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 1 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.53	194.53	194.53	189.74	152.52
Index in cents per lb.	5.270	5.270	5.270	5.140	4.132

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.95	$117.95	$117.95	$114.95	$91.64
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.10
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	32.58	33.08	33.67	34.33	29.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 1 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.35
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.35
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	5.302	3.83
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	3.95-4.00
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.25
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.25
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.50
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.40
Plates, Chicago	4.225	4.225	4.225	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.225	4.55	3.50
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.25
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.425	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45	4.00
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.00-4.15
Strip, C.R., Detroit	5.90	5.90	5.90	5.45-6.05	4.20-.25
Wire, Basic, Pitts.	5.75	5.75	5.75	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	4.675	4.675	4.675	4.525	3.40
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	50.16	50.16	50.16	61.25	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	46.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$32.50	$33.50	$34.50	$34.50	$32.00
No. 1 Heavy Melt, E. Pa.	32.25	32.25	33.50	35.00	26.00
No. 1 Heavy Melt, Chicago	33.00	33.50	33.00	33.50	29.50
No. 1 Heavy Melt, Valley	34.50	34.50	35.50	33.50	32.75
No. 1 Heavy Melt, Cleve.	32.50	32.50	33.50	31.50	30.25
No. 1 Heavy Melt, Buffalo	30.50	31.50	30.50	32.50	29.75
Rails, Rerolling, Chicago	52.50	54.50	54.50	46.00	44.50
No. 1 Cast, Chicago	39.50	39.50	39.50	34.50	42.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.75	$13.75	$13.75	$14.75	$13.25
Beehive Fdry, Connlsvl.	16.75	16.75	16.75	16.75	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

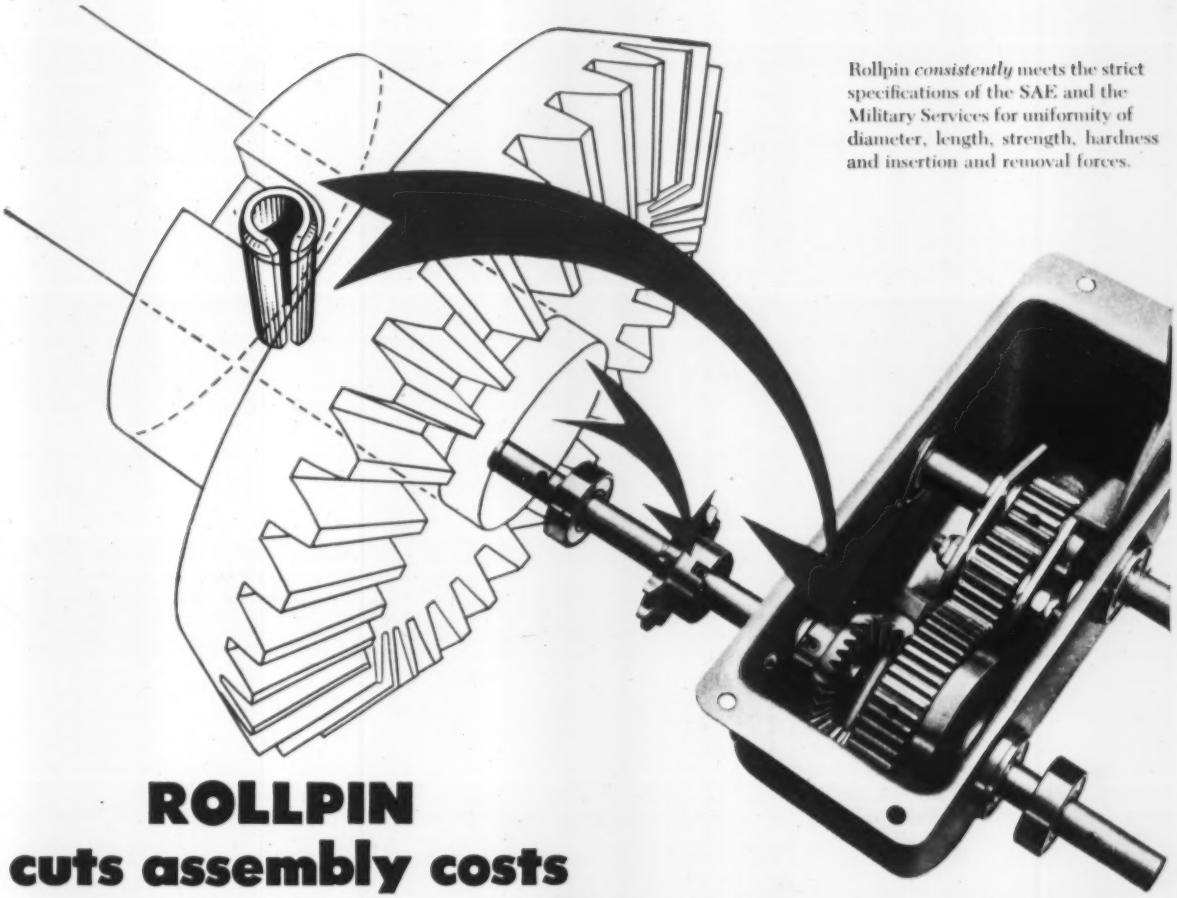
Daily Nonferrous Price Record

	Price Dec. 1	Last Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec. 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	30.000	29.750
Lead	14.80	Oct. 4	14.55	14.800	14.775	13.300
Zinc	11.50	Sept. 3	11.00	11.500	11.500	10.000
Tin	90.375	Dec. 1	89.875	91.196	93.110	84.913
Nickel	64.50	Nov. 24, 1954	60.00	60.000	60.000	60.000
Aluminum	22.20	Aug. 5, 1954	21.50	22.200	22.200	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+ %, deld.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**



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Nonferrous Metals

Talk of finding substitutes for tin continues though supplies of the metal have never been better. Government stockpile contains nearly 350,000 tons

Nonferrous Metal Prices, Pages 200 & 201

TIN SUBSTITUTION talk is still being heard despite the greatest oversupply the metal has known.

Seldom does a week go by without mention of a conservation program or research into finding alternatives to the 5000-year old metal. Why? Many industries were hamstrung during World War II and Korea by shortages. The United States, which uses over half the world production, is wholly dependent upon foreign countries for its supply; only 95 tons were produced from domestic (Alaskan) ores last year. In addition, the metal has run a flightly price course, with its high since the turn of the century ($1.84 in 1951) ten times its low (in 1932). These factors alone can easily discourage nonspeculative buyers.

Contra—Yet the tin industry has been faced with overproduction for 25 years except at the bottom of the depression and in time of war. Since 1948 production has exceeded consumption by about 30 per cent. Today, the national stockpile contains close to 350,000 tons of tin.

Because of political considerations, the government's Texas City tin smelter is not expected to discontinue operations soon. It has contracted for delivery of 12,000 tons of Bolivian ore. Though that country's output has deteriorated considerably since nationalization, it has been offset by increases in Malaya. A three-year contract with Indonesia for 20,000 tons of ore yearly is in its final year, expiring next March.

Guarantee—What will happen if the government doesn't continue sopping surplus metal? Tin traders fear the market will drop through the floor.

Chief ailment of the industry stems not from outright substitutions but in conversion of tin plate mills from hot dip to electrolytic mothods of plating steel. Though tinplate consumption has grown by leaps and bounds, because thinner coats are deposited, the use of tin has remained static.

Downtrend — Pricewise, tin has trended downward in recent weeks. Analysts account for it this way: The firm price level set by Indochina troubles and approval of the international scheme to temper price and production gyrations has finally worn off. Tin men are looking apprehensively to the day when Indonesian and Bolivian tin contracts end and that metal may come on the market. Maybe such a glut is the only thing that would silence some of the illogical shortage talk.

Latest ODM report to Congress states the minimum stockpile objective has been met, and an additional 60,000 tons of tin on hand or to be acquired will be held as government inventory.

STEEL's Metal Price Averages for Nov., 1954
(Cents per pound)

Electrolytic Copper, del. Conn.	30.000
Lead, St. Louis	14.800
Prime Western Zinc, E. St. Louis	11.500
Straits Tin, New York	91.196
Primary Aluminum Ingots, del.	22.200
Magnesium, Freeport, Tex.	27.000
Nickel, f.o.b. refinery	60.900

Improved Die Casting Finish

A hardware class finish on die cast aluminum parts as they come from the die is Alcoa's claim for new process advances. Geared to make aluminum die castings more attractive to manufacturers of appliances and automotive and builders' hardware, the techniques are said to open the path to widespread use of chromium-plated aluminum die castings.

Nonferrous Sellers to U.S.

Chile led the list of copper refinery product sellers in the U. S. for September, (at 9329 tons), but Canada was a surprisingly close second (7764 tons). Belgium and Luxemburg topped the field in shipping copper rolls, sheets and rods; while the United Kingdom led in copper tubes and seamless tubes; and France was leader in brazed copper tubes. Switzerland was well ahead in brass rods, sheets, bars and plates, but West Germany shipped more brass tubes and seamless tubing to the U. S. than all other countries combined.

Brass Prices Change

Brass mill product prices were reshuffled (effective Dec. 1) by Chase Brass & Copper Co. Most products moved upward to compensate for higher labor costs and to adjust for changes in metal costs, but free cutting brass rod was cut 1 cent to counter foreign competition in U. S. markets.

Yellow brass alloys advanced 0.55-cent; red brass products went up 0.45-cent; commercial bronzes gained 0.43-cent; and the 80-copper 20-zinc alloys moved up 0.48-cent. The copper water tube base is unchanged; new lists on nickel silver, phosphor bronze and other alloys are expected.

Extras for all products, save tube and free cutting rod, were increased 10 per cent, brass and copper tube extras were upped 5 per cent, but no change was made in free cutting brass rod extras. Scrap purchase price advanced fractionally, and quantity schedules were altered.

Another Titanium Cut

Second price reduction of the year in titanium sponge was announced last week by DuPont. Grade A-1 ductile titanium metal sponge (0.3 per cent fe max) was cut 22 cents to $4.50 a lb. Grade A-2 (0.5 per cent fe max) was dropped 46 cents to $4.00 a lb. The reductions were attributed to greater output resulting from plant expansion and improved production techniques. From 1948 until April of this year, titanium sponge sold at $5 a lb.

Market Memos

- Stockpile acquisitions of aluminum during the first half of 1954 were higher than in any six-month period since stockpiling began, even though new specifications were in effect to provide for a more realistic range of purities corresponding to normal industry uses.

- The government has sunk over a half-million dollars into seeking domestic mercury sources. At least twelve DMEA contracts are in force.

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Columbus, O. Chicago St. Louis New York

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 22.20, pigs 20.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 24; No. 43, 5% Si, 23.8; No. 142, 4% Cu, 25.1; No. 195, 4.5% Cu, 0.8% Si, 24.5; No. 214, 3.8% Mg, 26.2; No. 356, 7% Si, 0.3% Mg, 23.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 deld. Conn. Valley, 30.00 deld. Midwest; Lake 30.00 deld.; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks 1.3 in. diameter, 46.00, 100 to 4999 lb f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J

Mercury: Open market, spot, New York, $315-$320, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.65; "XX" nickel shot 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 90.375, prompt 90.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max) $4.50, grade A-2 (0.5% Fe max) $4 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb nom., f.o.b. shipping point; less than 1000 lb $5.10 nom.; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 21.25-21.75; No. 12 foundry alloy (No. 2 grade) 20.25-20.75; 5% silicon alloy, 0.60 Cu max., 23.75-24.00; 13 alloy 0.60 Cu max., 23.75-24.00; 195 alloy 21.75-22.75; 108 alloy 20.75-21.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.50-22.00; grade 2, 20.50-21.00; grade 3, 19.50-20.00; grade 4, 18.50-19.00.

Brass Ingot: Red brass, No. 115, 29.50; tin bronze No. 225, 41.00; No. 245, 34.75; high-leaded tin bronze, No. 305, 34.00; No. 1 yellow, No. 405, 25.25; manganese bronze No. 421, 27.75

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 26.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy.) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb. 36.53; l.c.l. 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM*

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	62.5	61.0	...	...
0.156-0.172	52.9	51.3	...	...
0.188	52.9	51.3	...	65.8
0.219-0.234	50.1	48.5	...	...
0.250-0.281	50.1	48.5	...	62.7
0.313	50.1	48.5	...	59.8
Cold-finished				
0.375-0.547	48.9	46.5	58.8	56.2
0.563-0.688	48.9	46.5	55.9	52.7
0.750-1.000	47.7	45.3	51.1	49.6
1.063	47.7	45.3	...	47.9
1.125-1.500	45.9	43.6	49.4	47.9
Rolled				
1.563	44.7	42.4	...	...
1.625-2.000	44.1	41.8	...	46.2
2.125-2.500	43.0	40.7	...	...
2.563-3.375	41.7	39.5	...	...

ALUMINUM*

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	34.9	...	...
0.135-0.096	12-48	35.4	...	...
0.095-0.077	12-48	36.1	33.6	38.6
0.076-0.061	12-48	36.7	33.8	38.8
0.060-0.048	12-48	37.2	34.1	39.2
0.047-0.038	12-48	37.7	34.6	39.6
0.037-0.030	12-48	38.1	35.0	40.3
0.029-0.024	12-48	38.7	35.3	40.8
0.023-0.019	12-36	39.4	36.1	41.6
0.018-0.017	12-36	40.2	36.7	42.5
0.016-0.015	12-36	41.1	37.5	43.7
0.014	12-24	42.1	38.5	45.0
0.013-0.012	12-24	43.3	39.2	46.0
0.011	12-24	44.3	40.4	47.6
0.010-0.0095	12-24	45.5	41.5	49.2
0.009-0.0085	12-24	46.8	43.0	51.3
0.008-0.0075	12-24	48.4	44.2	53.1
0.007	12-18	49.9	45.7	55.4
0.006	12-18	51.5	47.1	60.4

*72-180 in. lengths. †26 in. max. dia.

ALUMINUM*

Plates and Circles: Thickness 0.250-3.0 in. 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.7	38.9
5050-F	34.7	38.9
3004-F	35.7	40.6
5052-F	37.4	42.4
6061-T6	38.6	43.0
2024-T4*	40.8	46.9
7075-T6*	48.6	55.2

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM*

Forging Stock: Round, Class 1, 46.8-36.3, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 52.6-40 in. random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$515.70	2	$ 48.30
1	24.75	4	132.90
1¼	23.50	6	238.35
1½	40.05	8	358.60

*Alloy designations are standard for use on and after Oct. 1, 1954. To relate them to designations used prior to that time, see STEEL, Aug. 9, 1954, p. 95.

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 28 clippings 14.50; low copper clippings 14.50; mixed clippings 12.50; old sheet 11.00; borings and turnings 7.50; pistons and struts 8.00; crankcases 11.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Steamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire No. 1 26.00-26.50; No. 2 copper 24.50-25.00; light copper 22.50-23.00; No. 1 composition red brass 21.00; No. 1 composition turnings 20.50; mixed brass turnings 14.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 12.50; heavy yellow brass 15.50; new brass rod ends 16.00; auto radiators, unsweated 17.00; cocks and faucets 17.00; brass pipe 17.50.

Lead: Heavy 11.75-12.00; battery plate 6.25-6.50; linotype and stereotype 13.75-14.00; electrotype 12.00-12.50; mixed babbitt 12.50-13.00.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 5.00-5.25; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.75-16.00; 51S, 52S clippings 15.75-16.00; 14S, 17S, 24S clippings 15.00-15.25; mixed clippings 14.50-14.75; old sheet 13.75-14.00; old cast 13.75-14.00; clean old cable, free of steel 15.75-16.00; borings and turnings 14.00-14.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 28.50; No. 2 copper 27.00; light copper 25.50; refinery brass (60% copper) per dry copper content 25.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 28.50; No. 2 copper 27.00; light copper 25.50; No. 1 composition borings 23.00; No. 1 composition solids 23.25; heavy yellow brass solids 17.75-18.00; yellow brass turnings 16.75-17.00; radiators 18.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 5000-10,000 lb; electrodeposited 39.78, cast 42.04, 2000-5000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.085; 200-499 lb $1.07; 500-999 lb $1.065; 1000 lb or more $1.06.

Zinc: Bar 20.00, bar or flat top 19.00 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 69.6; 100-600 lb 55.4; 700-1900 lb 53; 2000-9900 lb 51.2; 10,000 lb or more 50.1.

Stannous Chloride (Anhydrous): Less than 50 lb $1.551; 50 lb $1.211; 100-300 lb $1.061; 400-900 lb $1.037; 100-1900 lb $1.013; 2000-4900 lb 97.6; 5000-19,000 lb 91.5; 20,000 lb and over 85.4.

Stannous Sulphate: Less than 5 lb $1.252; 50 lb 95.2; 100-1900 lb 93.2; 2000 lb and over 91.2.

Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.

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You have a right to expect "command performance" from every fastener you buy today. Modern automotive engines and aircraft power plants are being put to greater tests. Farm equipment is being designed to accomplish more at greater economies.

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That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought metal fastener to meet your specifications. It is a fastener of highest quality, uniform accuracy . . . to meet industry's *"command performance"*.

Write today for Bulletin 1264-CH

PRODUCTS CORPORATION

1488 CHARDON ROAD
CLEVELAND 17, OHIO

5005-CH

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; Key on page 203. Key to footnotes, pages 205.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)

Detroit R7 .....$65.00
Houston 85 .....73.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$64.00
Bessemer,Pa. U5 .....64.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 ....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 .....64.00
So.Chicago,Ill. R2,U5 ..64.00
So.Duquesne,Pa. U5 ...64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 .....$78.00
Bessemer,Pa. U5 .....78.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 ....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 ....78.00
Houston 85 .....85.00
Johnstown,Pa. B2 ....78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 .....87.50
Munhall,Pa. U5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14 .78.00
So.Duquesne,Pa. U5 ...78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 .....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 ....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston 85 .....93.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 .....86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago, R2,U5,W14 .86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP

Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
Munhall,Pa. U5 .....3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS

AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Houston 85 .....5.075
IndianaHarbor,Ind. Y1 .4.675
Johnstown,Pa. B2 .....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. 85 ....5.015
Kokomo,Ind. C16 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ..5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 ....4.675
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
SparrowsPoint,Md. B2..4.775
Torrance,Calif. C11 ...5.475
Worcester,Mass. A7 ...4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston 85 .....4.65
Ind.Harbor,Ind I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. 85 ....4.85
Lackawanna,N.Y. B2...4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.95
Portland,Oreg. O4 .....5.00
Seattle B3 .....5.00
So.Chicago U5, W14 ....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 .....4.25

Wide Flange

Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 ....5.25
Lackawanna,N.Y. B2 ..4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....3.95
So.Chicago,Ill. U5 ....4.25

Alloy Stand. Shapes

Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston 85 .....5.60
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 ....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 ....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston 85 .....6.80
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. 85 ....7.00
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14.6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES

Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2....5.075
Lackawanna,N.Y. B2 ..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 ....5.075

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Buffalo R2 .....4.225
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Cleveland J5, R2 .....4.225
Coatesville,Pa. L7 ....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich G5 .....4.375
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 ....3.975
Houston 85 .....4.625
Ind.Harbor,Ind. I-2, Y1.4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ..4.225
LoneStar,Tex. L6 .....4.55
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ...5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.226
So.Chicago,Ill. R2 ....4.225
So.Chicago,Ill. U5,W14 .4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ...4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 ....4.225
Youngstown R2,U5,Y1 4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron

Economy,Pa. B14 .....9.80

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston 85 .....6.85
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2 ..6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy

Claymont,Del. C22 ....5.80
Coatesville,Pa. L7 .....5.80
Fontana,Calif.K1 .....6.45
Gary,Ind. U5 .....5.80
Houston 85 .....6.20
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2 ..5.80

FLOOR PLATES

Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ...5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 ....5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 .....4.825

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.45
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston 85 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. 85 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.30
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23....5.05
So.Chicago, R2,U5,W14 4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 ....4.30
Youngstown R2, U5 ....4.30

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.075
Buffalo R2 .....5.075
Canton,O. R2, T7 .....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....6.125
Fairless,Pa. U5 .....5.225
Gary,Ind. U5 .....5.075
Houston 85 .....5.475
Ind.Harbor,Ind. I-2, Y1.5.075
Johnstown,Pa. B2 .....5.075
KansasCity,Mo. 85 ....5.675
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2, U5, W14 5.075
So.Duquesne,Pa. U5 ..5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston 85 .....6.85
Ind.Harb.,Ind. I-2, Y1..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. 85 ....7.05
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ....6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....4.85
Portland,Oreg. O4 .....5.05
SanFrancisco 87 .....4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston 85 .....5.60
KansasCity 85 .....5.80
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12,R2 5.40
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 ....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.60
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ...5.40
Gary,Ind. R2 .....5.40
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13 .5.40
Hartford,Conn. R2 ....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2, S30 ...6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2, R8 ....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.65
Putnam,Conn. W18 ....5.95
Readville,Mass. C14 ....5.95
St.Louis,Mo. M5 .....5.70
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md.(5) C19.4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12,R2 6.625
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 ....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.625
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
GreenBay,Wis. F7 .....6.625
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2..6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ....6.925
Massillon,O. R2, R8 ....6.625
Midland,Pa. C18 .....6.625
Monaca, Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ....6.925
Youngstown F3, Y1 ....6.625

BARS, Reinforcing
(To fabricators)

Ala.City,Ala. R2 .....4.30
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Cleveland R2 .....4.30
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.30
Houston 85 .....4.70

Ind.Harbor, Ind. I-2, Y1 4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Milton,Pa. M18 .....4.30
Minnequa,Colo C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SandSprings,Okla. S5 ..5.15
Seattle B3, N14, P23..5.05
So.Chicago R2 .....4.30
So.Duquesne,Pa. U5 ...4.30
So.SanFrancisco B3 ...5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown R2, U5 ....4.30

BARS, Reinforcing
(Fabricated; to consumers)

Johnstown,Pa., ¼-1" B2.5.70
KansasCity S5 .....6.50
LosAngeles B3 .....5.95
Marion,O. P11 .....5.55
Pittsburgh U8 .....5.72
Seattle B3, N14, P23 ..6.15
So.SanFrancisco B3 ...6.00
SparrowsPt, ½-1" B2...5.70
Williamsport,Pa. S19 ..5.60

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.20
ChicagoHts.(4) C2, I-2..4.30
Ft.Worth,Tex.(26) T4 ..4.75
Franklin,Pa. (3) F5 ..4.20
Franklin,Pa. (4) F5 ..4.30
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.30
Tonawanda(3) B12 ....4.15
Tonawanda(4) B12 ....4.30
Williamsport,Pa.(3) S19.4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks.(S.R.) L5 ..10.85
McK.Rks.(D.R.) L5 ..14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 gage and heavier)

Ala.City,Ala. R2 .....4.05
Allenport,Pa. P7 .....4.05
Ashland,Ky.(8) A10 ...4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit(8) M1 .....4.20
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fairless,Pa. U5 .....4.10
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 ....4.25
Houston S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Irvin,Pa. U5 .....4.05
Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ...4.05
Mansfield,O. E6 (37) ...4.05
Mansfield,O. E6 (38) ...4.80
Munhall,Pa. U5 .....4.05
Newport,Ky. N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
SparrowsPoint,Md. B2 ..4.05
Steubenville,O. W10 ....4.05
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 ga. lighter)

Ala.City,Ala. R2 .....5.35
Kokomo,Ind. C16 .....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. (14 ga. heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.10
Fairless,Pa. U5 .....6.15
Fontana,Calif. K1 ....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1.6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 .....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 ....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ....4.30
Cleveland R2 .....4.65
Ind.Harbor,Ind. I-2 ....4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....4.95
Cleveland J5, R2 .....4.95
Conshohocken,Pa. A3....5.00
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....4.95
Fairless,Pa. U5 .....5.00
Follansbee,W.Va. F4 ....4.95
Fontana,Calif. K1 .....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 ....5.15
Ind.Harbor,Ind. I-2, Y1.4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ...4.95
Middletown,O. A10 ....4.95
Pittsburg,Calif. C11 .....5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 .....4.95
SparrowsPoint,Md. B2 ..4.95
Steubenville,O. W10 ....4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.65
Fairless,Pa. U5 .....7.55
Fontana,Calif. K1 .....8.35
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ...7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron

Clevelaid R2 .....5.55
Middletown,O. A10 .....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert (16 Ga.)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.50	....
Canton,O. R2	5.70	6.15
Fairfield T2	5.70	....
Gary,Ind. U5	5.70	5.95
Ind.Harbor I-2	6.25	6.50
Irvin,Pa. U5	5.70	....
Kokomo,Ind. C16	6.35	....
MartinsFry.,O. W10	6.25	....
Newport,Ky. N9	6.25	6.50
Pitts.,Calif. C11	6.45	....
SparrowsPt. B2	5.70	....

SHEETS, Culvert Pure Iron

Ashland,Ky. A10 .....6.75
MartinsFerry,O. W10 ..6.50
Gary,Ind. U5 .....5.95

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.45‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45*
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ....5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16 .....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ..6.20‡
SparrowsPt.,Md. B2 ..5.45‡
Steubenville,O. W10 ...5.45‡
Weirton,W.Va. W6 ....5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized
High-Strength Low-Alloy

Irvin,Pa. U5 .....8.20
SparrowsPoint(39) B2 ..8.20

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.85
Irvin,Pa. U5 .....5.85
Kokomo,Ind. C16 .....5.95†
Newport,Ky. N9 .....6.00
Niles,O. N12 .....6.00

SHEETS, Galvanized Ingot Iron

Ashland,Ky. A10 .....5.70
Canton,O. R2 .....6.20

SHEETS, Galvanized
Ingot Iron
(Hot-dipped continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....6.175

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ..5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 ....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.25

SHEETS, Well Casing

Fontana,Calif. K1 ....6.325

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wick-Wire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng. HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless WeldedProducts
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn.Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan.San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2....4.05
Allenport,Pa. P7 .....4.05
Alton,Ill. L1 .....4.225
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 .....4.25
Bessemer,Ala. T2 .....4.05
Birmingham C15 .....4.05
Bridgeport,Conn.(10)S15 4.05
Buffalo(27) R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit M1 .....4.20
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Houston,Tex. S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Johnstown,Pa.(25) B2 ..4.05
KansasCity,Mo.(9) S5 ..4.65
Lackaw'na,N.Y.(25) B2.4.05
LosAngeles(25) B3 ....4.80
Milton,Pa. M18 .....4.05
Minnequa,Colo. C10 ...5.15
NewBritain(10) S15 ....4.05
N.Tonawanda,N.Y. B11.4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 ....4.05
Riverdale,Ill. A1 .....4.05
SanFrancisco S7 .....5.00
Seattle(25) B3, P23 ....5.05
Seattle N14 .....5.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3.4.80
SparrowsPoint,Md. B2 ..4.05
Sterling(1) N15 .....4.05
Sterling,Ill. N15 .....4.15
Torrance,Calif. C11 ....4.80
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5 .....4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.70
Fontana,Calif. K1 ....8.10
Gary,Ind. U5 .....6.70
Houston,Tex. S5 .....7.10
KansasCity,Mo. S5 ....7.30
LosAngeles B3 .....7.90
NewBritn.,Conn.(10)S15 6.45
Newport,Ky. N9 .....6.70
Seattle P23 .....7.80
Sharon,Pa. S3 .....6.70
So.Chicago W14 .....6.70
Youngstown U5 .....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.15
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.30
Fairfield,Ala. T2 .....6.15
Fontana,Calif. K1 .....7.25
Gary,Ind. U5 .....6.15
Houston S5 .....6.55
Ind.Harbor,Ind. I-2, Y1.6.15
KansasCity,Mo. S5 ....6.75
Lackawanna,N.Y. B2 ..6.15
LosAngeles(25) B3 .....6.90
Seattle(25) B3, P23 ....7.15
Sharon,Pa. S3 .....6.15
So.SanFrancisco(25) B3.6.90
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 .....6.15
Weirton,W.Va. W6 ....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....4.30
Warren,O. R2 .....4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.75
Baltimore T6 .....5.75
Bridgeport,Conn.(10)S15 5.75
Cleveland A7, J5 .....5.75
Conshohocken,Pa. A3 ..5.80
Dearborn,Mich. D3 ....5.90
Detroit D2, M1, P20 ..5.90
Dover,O. G6 .....5.75
Ecorse,Mich. G5 .....5.90
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 .....7.65
FranklinPark,Ill. T6 ....5.85
Ind.Harbor,Ind. I-2 ....5.85
Indianapolis C8 .....5.90
Lackawanna,N.Y. B2 ...5.75
LosAngeles C1 .....7.80
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 ....5.75
NewBedford,Mass. R10..6.20
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ....6.50
NewHaven,Conn. D2 ....6.20
Pawtucket,R.I. R3 ....6.40
Pawtucket,R.I. N8 ....6.30
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
Riverdale,Ill. A1 .....5.85
Rome,N.Y.(32) R6 ....5.75
Sharon,Pa. S3 .....5.75
SparrowsPt.,Md. B2 ....5.75
Trenton,N.J.(31) R5 ...7.30
Wallingford,Conn. W2 ..6.20
Warren,O. B9, R2, T5..5.75
Weirton,W.Va. W6 ....5.75
Worcester,Mass. A7 ....6.60
Youngstown C8, Y1 ....5.75

STRIP, Cold-Rolled Alloy

Carnegie,Pa. S18 .....12.45
Cleveland A7 .....12.45
Dover,O. G6 .....12.45
Fontana,Calif. K1 ....14.55
FranklinPark,Ill. T6 ...12.45
Harrison,N.J. C18 .....12.45
Mattapan,Mass. T6 ....12.80
Pawtucket,R.I. N8 ....12.80
Sharon,Pa. S3 .....12.45
Worcester,Mass. A7 ..12.75
Youngstown C8 .....12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5 .....8.60
Dearborn,Mich. D3 ....8.75

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Bridgeport,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
Bristol,Conn. W1	...	...	9.30	11.45	...
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.90	8.25	9.20	...	...
Detroit D2	5.90	8.25	9.20	10.95	...
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
Mattapan,Mass. T6	6.30	8.35	9.30	11.45	14.15
NewBritn.,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	...
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	...
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill.(1) A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6..	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	...
Buffalo W12	...	...	12.90	...	...
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	...	...
Youngstown C8	...	...	13.25	15.95	19.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom,W.Va. W10	....	....	9.10	10.10	11.00
Brackenridge,Pa. A4	....	....	9.10	10.10	11.00
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
Brackenridge,Pa. A4	....	....	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425	*8.95*	9.55	*10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85‡	11.75†
Vandergrift,Pa. U5	8.225	*8.75*	*9.35*	*10.35*	*11.25*
Warren,O. R2	8.225	†9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95§	12.50§	13.00§	14.00§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. § Coils, ¾-cent higher.

***Plus galvanizing extras.**

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.15
Warren,O. B9 .....6.15

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.775
Riverdale,Ill. A1 .....4.625
Sharon,Pa. S3 .....4.475
Youngstown U5 .....4.475

STRIP, Electrogalvanized

Dover,O. G6 .....5.75*
Riverdale,Ill. A1 .....5.85*
Youngstown C8 .....5.75*
Warren,O. B9 .....5.75*

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.35

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
Fairless,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TIN PLATE,American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.,Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Fairfield,Ala. T2	6.70
Fairless,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Irvin,Pa. U5	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60
Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4 ...6.20
Gary,Ind. U5 .....6.20
GraniteCity,Ill. G4 ....6.30
Ind.Harbor,Ind. Y1 ....6.20
Irvin,Pa. U5 .....6.20
Yorkville,O. W10 .....6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5 .....$7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10 .....$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5 .....9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..5.75
Aliquippa,Pa. J5 .....5.75
Alton,Ill. L1 .....5.925
Atlanta A11 .....5.95
Bartonville,Ill. K4 .....5.85
Buffalo W12 .....5.75
Chicago W13 .....5.75
Cleveland A7, C20 ....5.75
Crawfordsville,Ind. M8..5.85
Donora,Pa. A7 .....5.75
Duluth,Minn. A7 .....5.75
Fairfield,Ala. T2 .....5.75
Fostoria,O.(24) S1 .....5.95
Houston S5 .....6.15
Jacksonville,Fla. M8 ....6.27
Johnstown,Pa. B2 .....5.75
Joliet,Ill. A7 .....5.75
KansasCity,Mo. S5 ....6.35
Kokomo,Ind. C16 .....5.85
LosAngeles B3 .....6.70
Minnequa,Colo. C10 ....6.00
Monessen,Pa. P7 .....5.75
Newark 6-8 ga. I-1 ....6.40
No.Tonawanda B11 ....5.75
Palmer,Mass. W12 ....6.05
Pittsburg,Calif. C11 ....6.70
Portsmouth,O. P12 ....5.75
Rankin,Pa. A7 .....5.75
So.Chicago,Ill. R2 ....5.75
So.SanFrancisco C10 ...6.70
SparrowsPoint,Md. B2 ..5.85
Sterling,Ill.(1) N15 ....5.75
Sterling,Ill. N15 .....5.85
Struthers,O. Y1 .....5.75
Waukegan,Ill. A7 .....5.75
Worcester,Mass. A7 ....6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.375
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Cleveland A7 .....7.20
Donora,Pa. A7 .....7.20
Duluth,Minn. A7 .....7.20
Fostoria,O. S1 .....7.20
Johnstown,Pa. B2 .....7.20
LosAngeles B3 .....8.15
Millbury,Mass.(12) N6 ..7.50
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16..7.20
Muncie,Ind. I-7 .....7.40
Palmer,Mass. W12 ....7.50
Pittsburg,Calif. C11 ....8.15
Portsmouth,O. P12 ....7.20
Roebling,N.J. R5 .....7.50
So.Chicago,Ill. R2 ....7.20
So.SanFrancisco C10 ...8.15
SparrowsPt.,Md. B2 ....7.30
Struthers,O. Y1 .....7.20
Trenton,N.J. A7 .....7.50
Waukegan,Ill. A7 .....7.20
Worcester A7,J4,T6,W12 7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....6.90
Alton,Ill. L1 .....7.075
Buffalo W12 .....6.90
Cleveland A7 .....6.90
Donora,Pa. A7 .....6.90
Duluth,Minn. A7 .....6.90
Johnstown,Pa. B2 .....6.90
KansasCity,Mo. S5 ....7.50
LosAngeles B3 .....7.85
Minnequa,Colo. C10 ..7.075
Monessen,Pa. P7, P16 ..6.90
NewHaven,Conn. A7 ....7.20
Palmer,Mass. W12 .....7.20
Pittsburg,Calif. C11 ....7.85
Portsmouth,O. P12 ....6.90
Roebling,N.J. R5 .....7.20
So.Chicago,Ill. R2 .....6.90
So.SanFrancisco C10....7.85
SparrowsPoint,Md. B2 ..7.00
Trenton,N.J. A7 .....7.20
Waukegan,Ill. A7 .....6.90
Worcester,Mass. A7 ....7.20

WIRE, Fine & Weaving(8" Coils)

Alton Ill. L1 .....11.375
Bartonville,Ill. K4 .....11.30
Buffalo W12 .....11.20
Chicago W13 .....11.20
Cleveland A7 .....11.20
Crawfordsville,Ind. M8..11.30
Fostoria,O. S1 .....11.20
Jacksonville,Fla. M8 ...11.73
Johnstown,Pa. B2 .....11.20
Kokomo,Ind. C16 .....11.20
Minnequa,Colo. C10 ...10.95
Monessen,Pa. P16 .....11.20
Muncie,Ind. I-7 .....11.40
Palmer,Mass. W12 .....11.50
Roebling,N.J. R5 .....11.50
So.SanFrancisco C10 ..11.55
Waukegan,Ill. A7 .....11.20
Worcester,Mass. A7,T6.11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 .....9.90
Buffalo W12 .....9.90
Johnstown,Pa. B2 .....9.90
Minnequa,Colo. C10 ..10.025
Monessen,Pa. P16 .....9.90
Muncie,Ind. I-7 .....10.10
Portsmouth,O. D2 .....9.90
Roebling,N.J. R5 .....10.20
SparrowsPt.,Md. B2 ...10.00

ROPE WIRE (A)

Alton,Ill. L1 ..... 9.75
Bartonville,Ill. K4 ....9.35
Buffalo W12 .....9.75
Fostoria,O. S1 .....9.75
Johnstown,Pa. B2 .....9.75
Monessen,Pa. P7 .....9.35
Monessen,Pa. P16 .....9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Portsmouth,O. P12 ....9.35
Roebling,N.J. R5 .....10.05
SparrowsPt, B2 .....9.85
Struthers,O. Y1 .....9.75
Worcester J4, T6 .....9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton,Ill. LI	*13.25*
Bartonville,Ill. K4	13.25
Monessen,Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. MS	8.05
Dover,O. G6	7.95
Fostoria,O. S1	7.95
Kokomo,Ind. C16	8.05
FranklinPark,Ill. T6	8.05
Massillon,O. R8	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtucket,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	6.90	7.30**
Aliquippa J5	6.90	7.425‡
Atlanta A11	7.00	7.55
Bartonville(48) K4	7.00	7.55
Buffalo W12	6.90	7.30†
Cleveland A7	6.90	
Crawfordsville MS	7.00	7.55
Donora,Pa. A7	6.90	7.30†
Duluth,Minn. A7	6.90	7.30†
Fairfield T2	6.90	7.30†
Houston,Tex. S5	7.30	7.70†
Jacks'ville,Fla. M8	7.425	7.95
JohnstownB2(48)	6.90	7.45*
Joliet,Ill. A7	6.90	7.30†
KansasCity,Mo. S5	7.50	7.90†
Kokomo C16	7.00	7.40†
LosAngeles B3	7.85	
Minnequa C10	7.15	7.55**
Monessen P7 (48)	6.90	7.45
Palmer W12	7.20	7.60†
Pitts.,Calif. C11	7.85	8.25†
Portsmouth,O. P12	6.90	
Rankin A7	6.90	7.30†
So.Chicago R2	6.90	7.30**
S.S.Fran. C10	7.85	8.25**
SparwsPt.B2(48)	7.00	7.55*
Sterling(1)(48)N15	6.90	7.45
Struthers,O.(48)Y1	6.90	7.40‡
Worcester A7	7.20	

* Based on 11c zinc; † 5c zinc; ‡ Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.

Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga.J5	149‡
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	154†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	158†
Kokomo,Ind. C16	148†
Minnequa,Colo. C10	154**
Monessen,Pa. 9 ga. P17	151
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

† Based on 5c zinc; * 11c zinc; § 10c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. MS	157
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston S5	163
KansasCity,Mo. S5	167
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed Col.

Alabama,City,Ala. R2	159**
Aliquippa J5	156‡
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. MS	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	167†
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	171†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	165**
Monessen,Pa. P7	163
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	162

† Based on 5c zinc; * 11c zinc; § 10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Ala.City R2	13.15	14.70**
Bartonville K4	13.25	15.10
Buffalo W12	13.15	
Cleveland A7	13.15	
CrawfrdsvilleMS	13.25	15.10
Fostoria,O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	13.25	15.10*
Minnequa C10	13.40	15.10**
Palmer,Mas.W12	13.15	14.70*
Pitts.,Calif. C11	13.50	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	13.25	15.10*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	

* Based on 11c zinc; † 5c zinc; § 10c zinc; ** Subject to zinc equalization extras.

NAILS, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	145
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	149
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock

To dealers & mfrs. (7)	Col.
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	140
Crawfordsville,Ind. M8	140
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	140
Minnequa,Colo. C10	143
Monessen,Pa. P7	138
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
SparrowsPt.,Md. B2	140
Sterling,Ill.(1) N15	138
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	150
Duluth,Minn. A7	150
Franklin,Pa. F5	150
Johnstown,Pa. B2	150
Marion,O. P11	150
Minnequa,Colo. C10	155
Moline,Ill. R2	155
So.Chicago,Ill. R2	150
Tonawanda,N.Y. B12	150
Williamsport,Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

4 in. and shorter: ½-in. & smaller diam	2
Over 4 in. through 6 in.: ½ in. & smaller diam	+3
6 in. and shorter: ⅜-in. and ⅝-in.	+4
¾ in. and larger	+6
Longer than 6 in.: All diameters	+15
Lag bolts, all diams.: 6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoes	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy: Square, all sizes	55
H.P., Hex, regular & heavy: ¾" and smaller	55
⅞" to 1⅛", inclusive	58
1¼" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy: All sizes	55
Hot Galv. Nuts (all types): ¾" or smaller	38
⅞" to 1½", inclusive	41
Finished Hex Nuts: New standard, all sizes	55
Semifinished & Slotted Hex: Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	41—10
Plated finishes	21—10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter: ¼-in. through ⅝-in.	38
⅝-in. through 1 in.	15
Longer than 6 in.: ¼-in. through ⅝-in.	20
¾-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
7/16-in. under. List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13		19.59	19.00
1¼	13		23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2¼	12	34.63	41.52	33.59
2½	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	Std. Tee Rails 60 lb Under
Bessemer,Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	...	5.35
Fairfield,Ala. T2	...	...	...	5.35
Gary,Ind. U5	4.45	4.35	4.40	...
Huntington,W.Va. W7	...	...	...	5.35
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	...
Johnstown,Pa. B2	...	...	...	(16)5.35
Lackawanna,N.Y. B2	4.45	4.35	...	5.35
Minnequa,Colo. C10	4.45	4.35	...	5.85
Steelton,Pa. B2	4.45	4.35	...	5.35
Williamsport,Pa. S19	...	...	...	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa,Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle,Wash. B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2	5.425
Joliet,Ill. U5	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron: 98+% Fe, annealed	Cents 15.25
Unannealed: Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Electrolytic iron: Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe), (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns—83.00-148.00	
Aluminum: Atomized, 500 lb drums, frgt, allowed: Carlots	30.00
Ton lots	32.00
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	29.75-37.25†
Bronze, 5000-lb lots	48.75-52.00†
Copper: Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese: Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	89.50
Nickel-Silver, 5000-lb lots	45.50‡
Nickel-Silver, 5000-lb lots	49.00**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, 5000-lb lots	17.25-31.00‡
Tungsten Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.78c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower.
(38) 14 gage & lighter.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld to mill zone or within switching limits, 5.10c.
(43) 9-14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Etna, Pa. N2	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless, Pa. N3	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	...	....	...
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sharon, Pa. M6	13.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.00	41.00	39.25	42.25	44.75	48.75	48.75
305	19.50	25.50	....	36.25	37.00	37.25	40.00	46.50	46.50
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	42.75	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	46.75	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.50	54.50	53.25	55.50	58.75	62.75	62.75
316L	....	....	51.50	59.50	58.25	60.50	63.75	67.75	67.75
317	33.00	43.50	57.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	45.75	50.50	50.50
347	34.50	45.75	53.75	61.50	62.00	63.25	68.25	76.50	76.50
18-8CbTa	28.25	37.25	45.00	51.25	52.00	52.75	57.50	65.50	65.60
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	18.75	24.50	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	33.50	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	31.00	31.00
304	27.60–28.10	32.50–33.20	32.50
310	36.50	41.00	....
316	32.60–33.10	37.70–42.75	42.75
318	37.00–37.50	42.20–42.70	....
321	29.36–29.80	34.40–37.00	37.00
347	30.40–30.90	35.50–40.50	40.50
405	23.40–23.90	30.60–31.10	....
410	22.00–23.40	30.10–30.60	....
430	23.40	30.60	....
Inconel	46.90	61.90	....
Nickel	38.30	51.70	....
Monel	39.70	52.66	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	28.85	35.85	25.00	32.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Gadsden, Ala. R2	52.38	52.88	....	....
Woodward, Ala. W15	52.38	52.88	56.50†	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo R2	56.00	56.50	57.00	57.50
Buffalo H1	56.00	56.50	57.00	....
Tonawanda, N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda, N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	....
Rochester, N.Y., deld.	59.02	59.52	60.02	....
Syracuse, N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary, Ind. U5	56.00	....	56.50	....
Indiana Harbor, Ind. I-2	56.00	....	56.50	....
So. Chicago, Ill. W14, Y1	56.00	56.50	56.50	....
So. Chicago, Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
Muskegon, Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron, O., deld.	58.75	59.25	59.25	59.75
Lorain, O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	58.00	58.50	....	....
Chester, Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton, Pa. B2	58.00	58.50	59.00	59.50
Swedeland, Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	....	....	....
Troy, N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
Neville Island, Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKeesRocks, deld.	....	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	58.16	58.16	58.66
Verona, Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa. U5	56.00	....	....	....
McKeesport, Pa. N3	56.00	....	....	57.00
Midland, Pa. C18	56.00	....	....	....
Monessen, Pa. P7	56.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard, O. Y1	....	....	56.50	....
Sharpsville, Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield, O. deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie, Pa. I-3	56.00	56.50	56.50	57.00
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	56.00	56.50	....	....
Granite City, Ill. G4	57.90	58.40	58.90	....
Ironton, Utah C11	56.00	56.50	....	....
LoneStar, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	58.00	59.00	59.00	....
Rockwood, Tenn. T2	....	52.50*	56.50	....
Toledo, O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson, O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, Openhearth & Fdry, freight allowed K2	85.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	88.00
Wenatchee, Wash. OH & Fdry, freight allowed K2	85.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood, Tenn. T3	70.00
Steelton, Pa. B2	64.00
Philadelphia, deld.	67.55
Troy, N.Y. R2	64.00

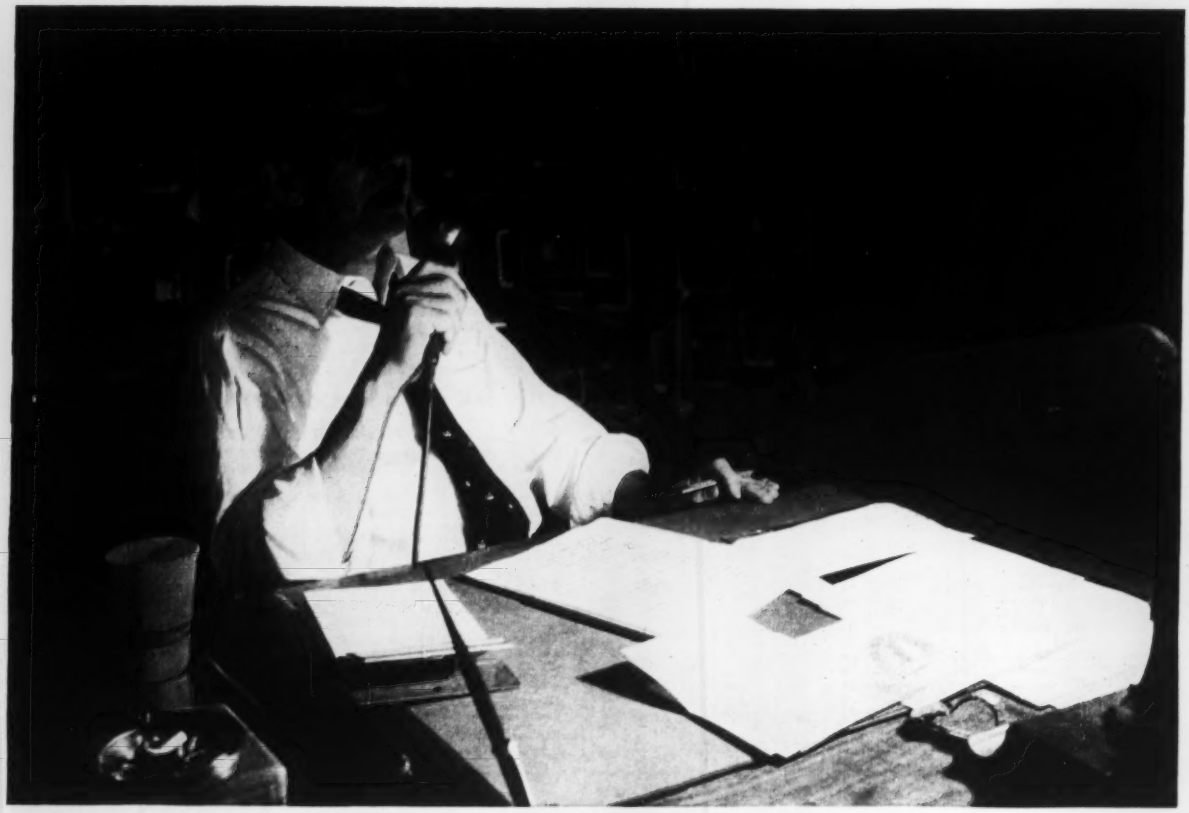
Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡‡	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††§		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.69	...	6.68	8.52[4]	12.04	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25[2]	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	44.78[9]	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	45.55	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	45.80	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45[4]	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.60	7.35	8.75
Los Angeles	7.40	9.25	9.85	50.15	7.75	11.75	7.35	10.05	13.20	7.55	7.35	9.45
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	7.04	6.87	...
New York	6.97	7.91	8.79	44.45	7.56	...	7.37	8.73[4]	12.28	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98[9]	6.96	8.80	6.74	8.36[4]	12.10	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	45.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64
Portland, Oreg.	7.60	8.75	9.35	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	...	7.17	8.26	....	7.35	7.18	8.30
San Francisco	7.55	8.95	8.70	51.65	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.65[7]	10.05	....	7.80	...	7.80	10.85‖§	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati, Cleveland (11.50-cent zinc) and in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§ under ½-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999; [2]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.



"We've been in the dark"

"Miss Jones—

"These notes cover what I intend to discuss at the committee meeting tomorrow. Please type them and attach them to the Wolverine proposal we received this morning. And set up my office for a 10:00 meeting tomorrow."

• • •

"Gentlemen:

"As you know we've been in the dark for some time as to how best increase the capacity of our heat exchangers. Space is at a premium, and the obvious answer of a larger heat exchange unit is out of the question.

"I've been talking to some of the men at Wolverine Tube and they've come up with what looks like the answer. They suggest using Wolverine Trufin*—their integral finned tube. Wolverine extrudes the fins right from the tube wall: Trufin is just about the most efficient tube I've ever seen. We can boost our output, improve our product at the same time.

"There are other advantages, too. Trufin can be bent or coiled just as easily as plain tube. In order to meet varying corrosive conditions, it's made in several metals: copper and copper-base alloys, aluminum, electric-welded and stainless steel, bi-metal and others.

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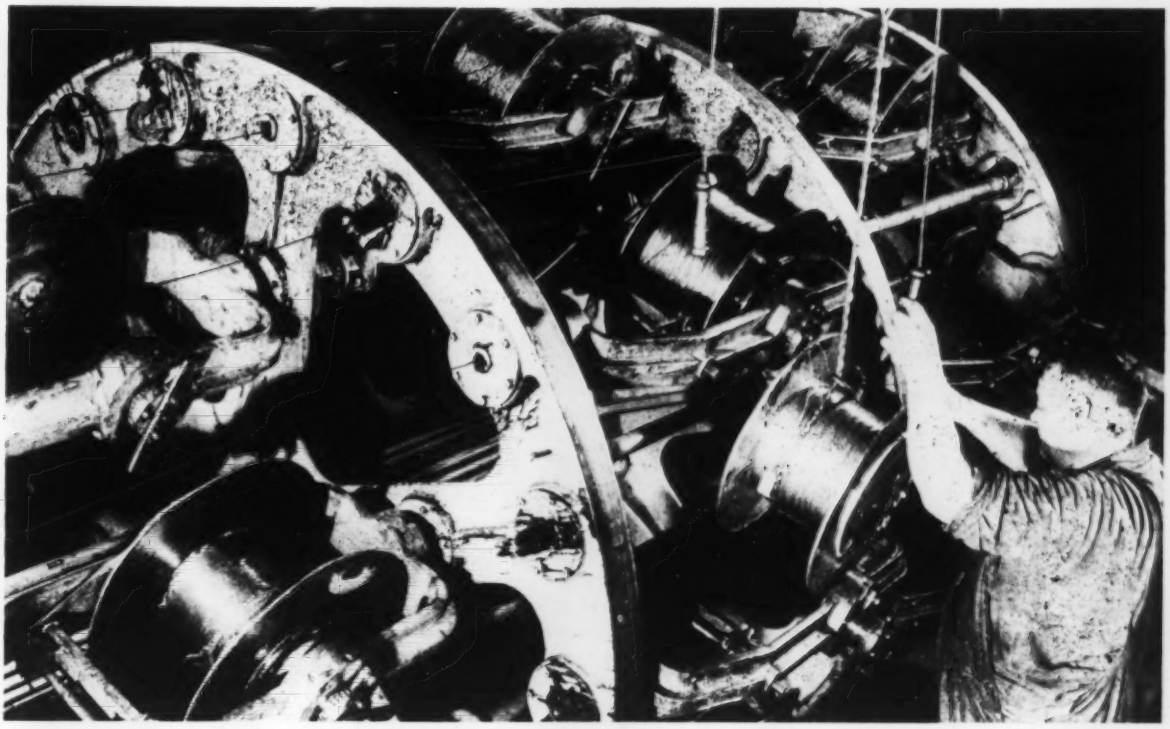

Jones & Laughlin Steel Corp.

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Wire Rope's Knotty Sales Problems

WIRE ROPE business is getting back to normal, but what "normal" means depends on whether you're a producer or a consumer.

War is the heyday of wire rope sales, and it was during the war years that producers had their best sales years. Capacity was built up to the point where it's now in excess of demand. Now it's a buyer's market, and the competition for the smaller peacetime business is spirited to say the least.

Competition—Not helping the 25 or so producers of wire rope is increasing foreign competition, and the unloading of government surplus rope on the market. The foreign influence is felt more on the coasts than in the Midwest, but the opening of the St. Lawrence Seaway may open a new avenue for that trade.

In the meantime, wire rope manufacturers are increasing their own efficiency and depending on better customer service to win sales. Old machinery is being scrapped and new installed. Freight is a big item for producers to consider, with most shipments of over 200 lb being prepaid. That means efficient warehousing and distribution setups.

Better Service—Along that line is U. S. Steel's American Steel & Wire Division's new warehouse in Denver. Said to carry the largest stock of wire rope between Chicago and the Pacific ocean, one of its most important functions is better, faster customer service.

Automated materials handling is getting a big play, too. Upson-Walton Co., Cleveland, has a high degree of automation in its plant warehouse to speed the transfer of materials. Union Wire Rope Corp., Kansas City, Mo., installed a half-mile conveyor system (using wire rope, naturally) in its plant about 18 months ago. Materials handling experts said the rope wouldn't stand up, but, to date, not one piece has needed replacing.

Except for the war years, wire rope output has pretty much paralleled general industrial activity. Now, with business picking up, most producers look for a somewhat better year in 1955 than they had in 1954.

Mainstays—The oil drilling industry, biggest consumer of wire rope, will continue at a good pace. It has been one of the brighter spots in the wire rope picture this year. General industry should use more rope next year. For example, the steel industry itself buys large quantities of wire rope and should up consumption in response to higher operating rates.

Construction business in 1954 was disappointing in view of its high level of activity. Big inventories are given as one reason for the slack; better things are looked for in 1955. Mining is another user likely to hike consumption. Highway guard rails are a steady source of business.

Most wire rope is sold for the traditional use. New volume markets are hard to find, though small ones are frequent. Overhead garage doors are one example. Jones & Laughlin Steel Corp. makes rope with thermocouples in a special core. It is used in grain bins to record temperatures and alert users against fires or temperature changes affecting their product.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 203 & 204

Demand for the light, flat-rolled products continues to expand, especially in cold-finished and galvanized sheet and strip. Orders are still piling up on mill books, with deliveries increasingly extended.

Some easing up in pressure from the automotive interests is noted, however, reflecting heavy commitments of recent weeks that carry mill backlogs well into first quarter. But other consuming lines are ordering more actively, this being mirrored in lengthening deliveries on long terne sheets, enameling stock and silicon material.

Delivery promises on cold-rolled sheets, the major tonnage item, fall within a range of six to 10 weeks for the most part, though some sellers are said to be booked up through the first quarter. Four-week shipment can still be obtained without too much difficulty on hot-rolled sheets.

Long terne shipments are becoming more extended, with considerable tonnage going into automobile radios and gas tanks. Enameling stock is moving briskly, deliveries running eight to 10 weeks in some cases. On electrical sheets, eight-to-ten-week delivery is quoted, while on stainless, shipments extend to eight weeks with some producers.

Some duplication of orders is showing up in galvanized sheets as supply becomes increasingly tight. This is resulting in some order cancellations, notably where tonnage is accepted by one mill for an earlier delivery date than that promised by another supplier. Also indicating the increasing stringency is the placing of orders for tonnage in excess of normal inventory requirements.

Another interesting aspect of the galvanized situation is the spreading range in delivery promises. For instance, one leading producer is booked ahead 26 weeks on continuous hot-dipped sheets, while another large seller can still accept tonnage of similar grade for early March shipment.

Inland Steel Co., effective Nov. 30, discontinued production of hot-rolled electrical sheets in cut lengths. Customers were informed some time ago.

Still another important development in the sheet market concerns expansion of cold-rolling capacity. Empire Steel Corp., Mansfield, O., plans to place new cold-rolling facilities in operation during the first quarter. They are the final step in a $20 million expansion and modernization program started five years ago.

The new cold mill will be housed in a recently-completed structure. It will include a 4-stand, 4-high 52-in. tandem mill designed to cold-reduce strip in coils at 2000 ft per minute. When completed, the new facility will enable Empire to produce cold-reduced and silicon sheets and strip in coils or cut lengths. Gages range from 14 to 30 inclusive, up to 43-in. wide. Facilities will be available to slit to narrow widths.

Stainless Steel . . .

Stainless Steel Prices, Page 206

The price increase on nickel prompts speculation on stainless steel quotations. Stainless producers cut their profit margin last summer when they held prices despite a wage increase for steelworkers. Recently the price of one stainless grade containing ferrocolumbium and ferrocolumbium-tantalum was increased when the cost of raw material rose.

While an increase in stainless grades containing nickel may be necessary, producers will make no announcements until they have thoroughly studied cost. Producers don't expect nickel to be in any easier supply as a result of the higher price. If anything, it may be harder to obtain next year if demand for stainless continues to rise.

Tin Plate . . .

Tin Plate Prices, Page 204

Shipments of metal cans in the first nine months this year, showed a slight gain (3,227,128 against 3,206,526 tons) over the like period of 1953. September shipments of 457,922 tons were down from 523,140 tons the preceding month and from 484,561 tons in the corresponding period of last year.

Cans for fruits and vegetables (including juice, the principal consuming category) amounted to 1,085,506 tons for the first nine months, against 1,116,517 in the like period last year. September shipments totaled to 225,439 tons, against 272,447 in August and 240,511 in September 1953.

Shipments of beer cans, second largest category, amounted to 518,345 tons in the first nine months, against 495,838 in the corresponding period of 1953. However, September shipments were off definitely from those of a year ago, amounting to 52,494 tons compared with 63,795.

Effective Nov. 27, Great Britain suspended import duties on American tin plate and tinned sheets until next Sept. 18. The British Board of Trade says increasing demands for the ma-

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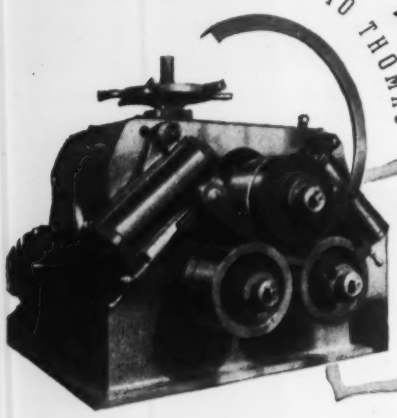

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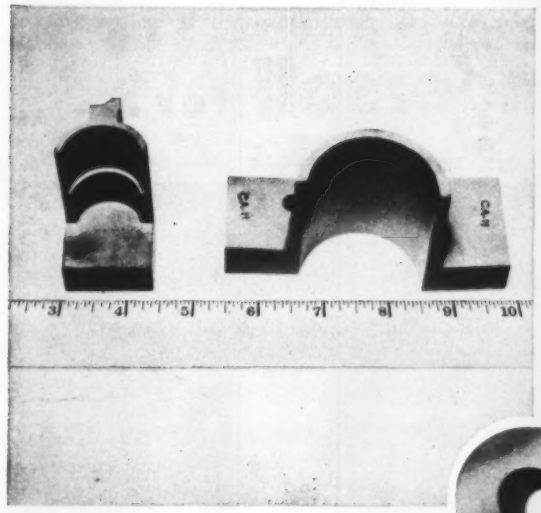

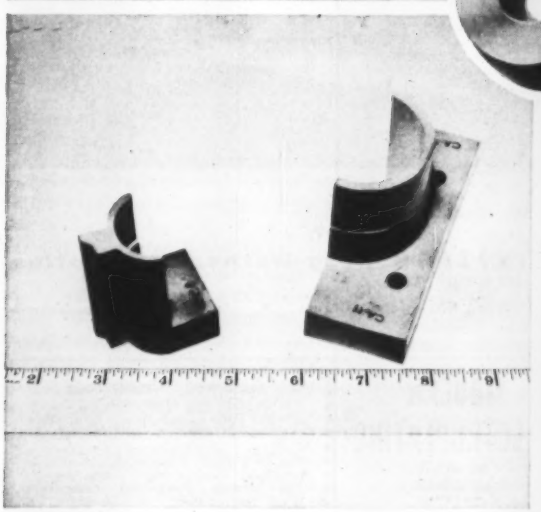

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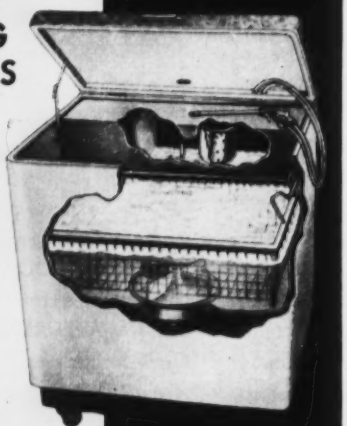

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terial cannot be met by domestic production.

In recent years only token amounts of American tin plate have been imported, dropping from $36,120 in 1947 to only $196 the last five years.

Although tin plate requirements currently are easier because of seasonal influences, new tonnage isn't available from the mills before late December or January.

Steel Bars . . .

Bar Prices, Page 202

While most bar specifications still are available for delivery within three weeks, demand is improved.

Business in hot-rolled carbon alloy is expanding slowly in the East, but the trend is definitely upward and deliveries are a shade more extended. Cold-drawn bar demand also is stronger. Purchasers are beginning to place orders with several weeks lead time.

Over-all volume this quarter is above that of the preceding three months, although incoming orders have been coming in at only a slightly better rate. More encouraging to sellers is the steady rate of buying for early first quarter shipment.

Farm equipment makers, appliance manufacturers and a wide variety of small consumers are contributing to the general pickup.

In the Chicago area, orders for carbon and alloy bars have improved to the extent one maker in the district no longer can squeeze spot tonnage into its rolling schedules.

Plates . . .

Plate Prices, Page 202

Continued softness in plate demand is reflected in mill deliveries of anywhere from a week to 10 days. Producers see little change in prospect over remainder of this year, apart from a probable further lag around the holidays.

With line pipe work tapering rapidly, after having contributed importantly to plate mill operations for many months, producers are hoping there will be an early revival through the placing of some major lines here and in Canada. The major domestic project in sight is the 450,000-ton line from Houston, Tex., to Newark, N. J.

Placing of pipe line work in volume would have at least an indirect bearing on virtually every plate mill in the country. Prospects for ship work after the turn of the year are a little better, but the outlook in railroad equipment requirements continues drab.

Thirteen thousand tons of tunnel steel (double shelled steel casing) for Hampton Roads, Va., noted in these columns last week as going to Baldwin-Lima-Hamilton Corp., Eddystone, Pa., includes about 5000 tons of $\frac{5}{8}$-in. plate and 5000 tons of $\frac{1}{4}$-in. plate.

Warehouse . . .

Warehouse Prices, Page 207

November warehouse business tallied up as the best since last march, and, indications are, December will make a good seasonal showing.

Mills continue to take small orders by offering quick service, except in the case of flat-rolled products. General tightness in these items is indicated by the narrowed stocks, especially of cold-rolled and galvanized sheets held by distributors.

On the West Coast, most distributors are holding purchases close to immediate requirements since their stocks are well balanced.

Tubular Goods . . .

Tubular Goods Prices, Page 206

Although some consumers are trimming inventories as year end approaches, sales of seamless tubular goods are reported holding steady. Oil country tubing sales, however, are off, the dip in order volume, which started some time back, continuing.

Welded tube shipments are larger this quarter than in the preceding three months, but the pickup in sales is slow. Most buying is for immediate use. Mills are offering quick shipments and are still taking fourth quarter orders for welded pipe.

Following the anticipated holiday slowdown in sales, it is expected consumers will start bolstering their inventories in January.

Babcock & Wilcox Co. has purchased assets and business of the Globe Steel Tubes Co., Milwaukee, for $9,300,000. The new owner will run the Globe plant as a part of its Tubular Products Division. The plant, which employs about 1000, produces seamless and welded stainless, alloy and carbon steel and a variety of aircraft tubing, pressure tubing and welding fittings. Its operation will continue without interruption.

Wire . . .

Wire Prices, Pages 204 & 205

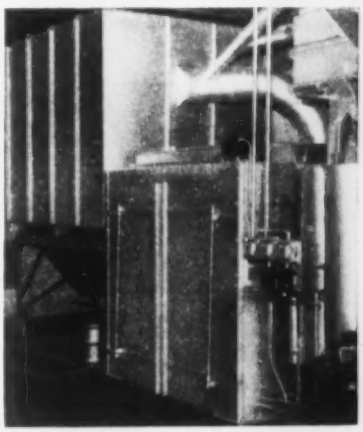
While the mills hold orders through first quarter, delivery on many finished wire products is not yet extended to the point where consumers are ordering far ahead. There are openings in January schedules, notably for fine wire volume which is lagging behind medium and heavier

"Tailor-Made"

TO YOUR REQUIREMENTS

MACLEOD

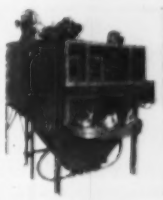
BLAST CLEANING ROOMS



Modern Macleod Blast Cleaning Rooms—designed with the skill and know-how of more than half a century's manufacturing experience—are "tailor-made" to suit the desires of their users. That's why, whatever your specifications or requirements, you can be sure that a Macleod Blast Cleaning Room will fill your needs to your complete satisfaction.

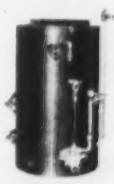
For use with these rooms, Macleod offers a wide selection of Dust Arrestors—in both the screen and filter-tube types. They may be used either as an adjacent (as illustrated above) or outside building installation.

BLAST CLEANING CABINETS



Shown at right is the versatile, new type AL "Rapid-Blast", specifically designed for high rates of continuous production, and especially adaptable to internal cleaning of work. Macleod offers several standard Blast Cleaning Cabinets, such as the "Rapid-Blast," but our Engineering Department will be happy to work with you in designing a special cabinet should your particular requirements demand it.

BLAST CLEANING MACHINES



The Macleod Type "H" Blast Cleaning Machine (at left), is available in both portable and stationary models. Along with low cost operation, it features low initial cost and superior blasting efficiency. Macleod offers an extensive line of Blast Cleaning Machines—portable and stationary, for floor level or pit installation, and in semi-automatic and fully-automatic, continuous cycle models.

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The MACLEOD COMPANY
33 Mosteller Road, Sharonville, Ohio
Send this coupon for MACLEOD Bulletins:
☐ No. 600 Rooms ☐ No. 300-A Cabinets
☐ No. 200 Machines
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Address _____
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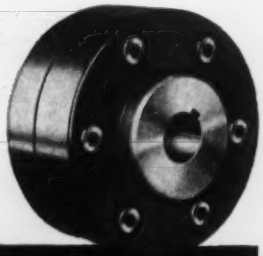
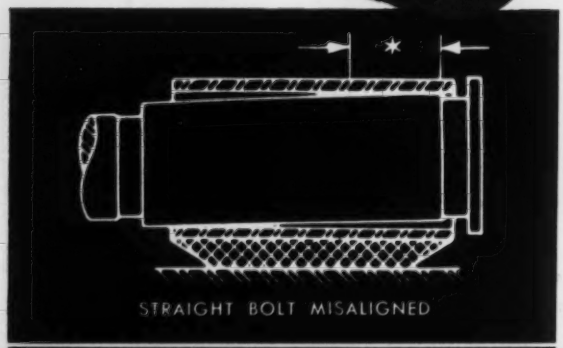
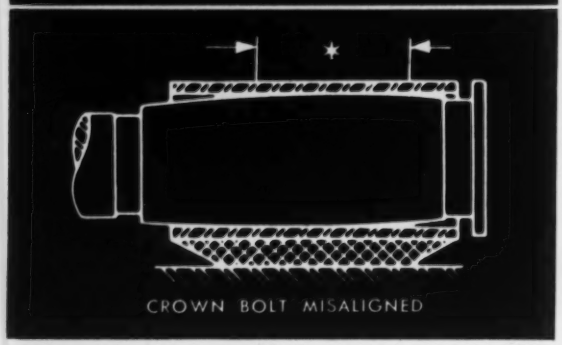
The crown distributes the load in

DE LAVAL
Crown Couplings







*Displacement of center of loading.

The crowned bolt in De Laval crown couplings increases the life of the rubber bushing by distributing stresses over a greater area. That means 1. Bushing and bolt are subject to lower unit pressures, less deformation and less wear. 2. Greater misalignment is permissible. 3. Vibration is most effectively dampened. • *Bulletin 2203 contains complete selection data on De Laval crown couplings. Send for your copy.*

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DE LAVAL STEAM TURBINE COMPANY
DL284 *860 Nottingham Way, Trenton 2, New Jersey*

The *Cleveland Steel Tool Co.*
• PUNCHES • DIES • CHISELS • RIVET SETS •
IF IT'S *RIVETED* YOU KNOW IT'S SAFE
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ARTUS PLASTIC SLITTING MACHINE SHIMS
COST JUST A FRACTION OF METAL SPACERS
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ALWAYS RETAINS UNIFORMITY AND EVENNESS UNDER ALL NORMAL CONDITIONS
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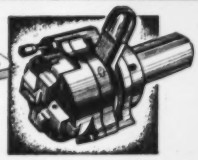
INDUSTRIAL PRODUCTS SUPPLIERS 201 South Dean Street Englewood N J

H&G Insert Chaser DIE HEADS



famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.
Pacific Coast Representative: *A. C. Berbringer, 334 N. San Pedro St., Los Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada.*

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SEAMLESS or WELDED
AIRCRAFT • MECHANICAL
PRESSURE • STAINLESS
STAINLESS PIPE & FITTINGS
SERVICE STEEL
DETROIT • BUFFALO • CHICAGO • CINCINNATI • LOS ANGELES

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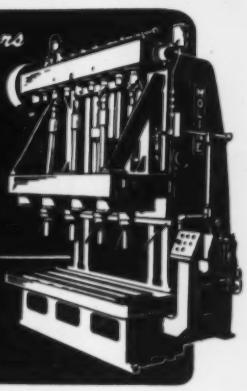
For Over 50 Years
"HOLE-HOG"
Specially Designed
MACHINE TOOLS
Have Cut Production Costs for American Industry



MOLINE TOOL CO.
No. HU68 Hydraulic rail feed universal joint type multiple spindle drilling machine

SPRINGS STAMPINGS WIRE FORMS

M. D. Hubbard Spring Company 403 Central Ave., Pontiac 12, Mich.

grades. Wire used in automobile assembly is more active, including springs. Heading wire is slow.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 202

Rolling mill backlogs in the Pacific Northwest are declining in the face of limited new business over recent weeks. Mill operations, however, are steady and are expected to continue so through the winter. Several highway projects in the area are unplaced and should be coming out shortly. Competition in the reinforcing market is increasingly keen.

Steel Receipts Off in West

Consumption of steel mill products in the seven far western states this year will total about 5,400,000 net tons, 10 per cent down from 1953 record peacetime consumer receipts of 6,079,000 net tons.

The estimate is contained in Kaiser Steel Corp.'s annual steel consumer survey which details use and distribution of mill products in 1953. It gives these comparative figures:

RECEIPTS IN SEVEN FAR WESTERN STATES

PRODUCT GROUP	Net Tons 1953	Net Tons 1952	Per Cent Change
Plates, sheared & U. M.	1,108,000	939,000	+18
Structural shapes	544,000	414,000	+31
HR Bars & Bar Size Shapes	989,000	1,030,000	— 4
Sheets & strip	1,126,000	869,000	+30
Standard & line pipe	530,000	475,000	+12
Tin mill products	895,000	867,000	+ 3
All other	1,124,000	821,000	+37
Gross total	6,316,000	5,415,000	+17
*Adjustment for conversion	237,000	68,000	+249
Net total	6,079,000	5,347,000	+14

*Steel mill products received by consumers and converted into other steel products subtracted from total to avoid duplication.

Local mills provided 56 per cent of the total steel received in the seven states — California, Oregon, Washington, Idaho, Utah, Arizona and Nevada—in 1953. Eastern mills supplied about 42 per cent and imports from foreign countries 2 per cent.

Iron Ore . . .

Iron Ore Prices, Page 217

Shipments of iron ore on the Great Lakes in the 1954 shipping season to Nov. 29 total 60,715,876 gross tons, reports the Lake Superior Iron Ore Association. This compares with cumulative shipments of 95,838,852 tons to Nov. 29 in the 1953 navigation season. Movement in the latest week of record was only 294,406 tons, with the shipping season rapidly nearing a close.

Inland Steel Co.'s Great Lakes fleet in the 1954 shipping season floated 3,149,000 gross tons of iron ore and limestone. This compares with 2,543,000 tons in the 1953 season. The Inland fleet was one of the few that operated full throughout the 1954 season.

Pig Iron . . .

Pig Iron Prices, Page 207

Blast furnace production increased slightly from September to October, but was off sharply from that in October, 1953, reports the American Iron & Steel Institute.

During the month 4,983,680 net tons were produced, of which 4,937,436 tons were pig iron and 46,244 tons, ferromanganese and spiegeleisen. In the preceding month output totaled 4,461,822 tons, of which 4,417,888 tons were pig iron and 43,934 ferromanganese and spiegeleisen. Production in October last year was 6,497,710 net tons, 6,419,752 tons being pig iron and 77,958 tons, ferromanganese and spiegeleisen.

The blast furnaces produced 47,841,013 net tons of metal in the first 10 months this year. Of the total 47,384,525 tons were pig iron and 456,488 tons ferromanganese and spiegeleisen. In the like period last year total output of 64,001,319 tons consisted of 63,275,079 tons of pig iron and 726,240 tons of ferromanganese and spiegeleisen.

Consumption of pig iron is the heaviest since the early part of this year. Most gray iron foundries are busier under the direct and indirect influence of automotive demand for castings. Heavier bookings are being received also from the farm machinery industry which is stepping up operations moderately.

Demand for pig iron in December is expected to shrink a little, with seasonal influences mainly responsible.

Rails, Cars . . .

Track Material Prices, Page 205

The U. S. Engineer at Portland, Oreg., is considering bids for materials involved in relocation of a section of the Union Pacific railroad, a unit of The Dalles power project. Colorado Fuel & Iron Corp., Columbia-Geneva Division, U. S. Steel Corp., and Bethlehem Pacific Coast Steel Corp. submitted tenders of about $500,000. Quantities involved are 3673 tons of rail, 4125 pairs of joint bars, 800 tons of tie plates. The Rail Joint Co., San Francisco, offered on joint bars only.

Ferroalloy Prices

FERROALLOY quotations remain unchanged. The current price schedule was published in full on page 112 of the Nov. 29 issue of STEEL.

Canada . . .

Production of primary iron and steel shapes in Canada during August totaled 316,632 net tons, of which 306,308 were carbon and 6324 alloy. July output was 309,308 tons, of which 303,307 were carbon and 6154 alloy, while production in August, 1953, was 372,935 tons, including 361,601 carbon and 11,334 alloy.

Shipments under producers' interchange for further processing within primary plants amounted to 106,784 tons in August, against 112,831 in July and 119,158 in August, 1953.

Steel Import Prices

(Base, per 100 lb, landed, duty paid)

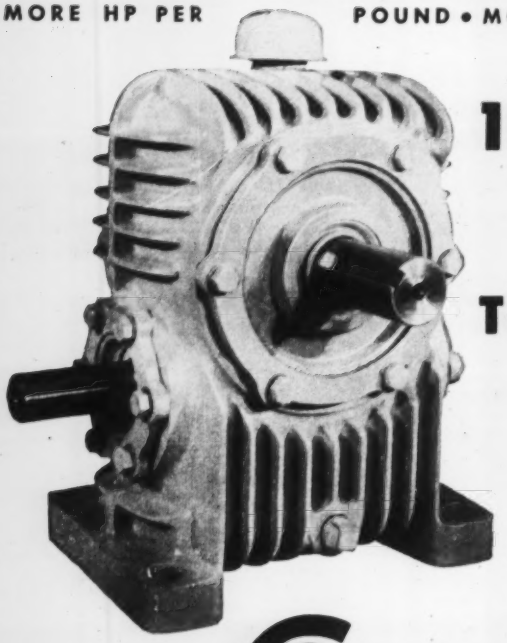
	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$5.05	$5.05	$4.95	$5.33
Bar Size Angles	4.60	4.60	4.60	4.98
Structural Angles	4.55	4.55	4.55	4.98
I-Beams	4.50	4.50	4.50	4.83
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.50	5.50	5.50	5.78
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.80	27.00	26.80	27.60
Barbed Wire (†)	6.05	6.05	6.05	6.23
Merchant Bars	4.95	4.95	4.95	5.33
Hot-Rolled Bands	5.15	5.15	5.15	5.43
Wire Rods, Thomas Commercial No. 5	5.10	5.17	5.15	5.42
Wire Rods, O-H Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling. †Per 82-lb. net, reel.

Sizes O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

MORE HP PER POUND • MORE HP PER CU. IN. • MORE HP PER DOLLAR



190,000 STANDARD *Stock* ANSWERS TO *Your* DRIVE PROBLEMS

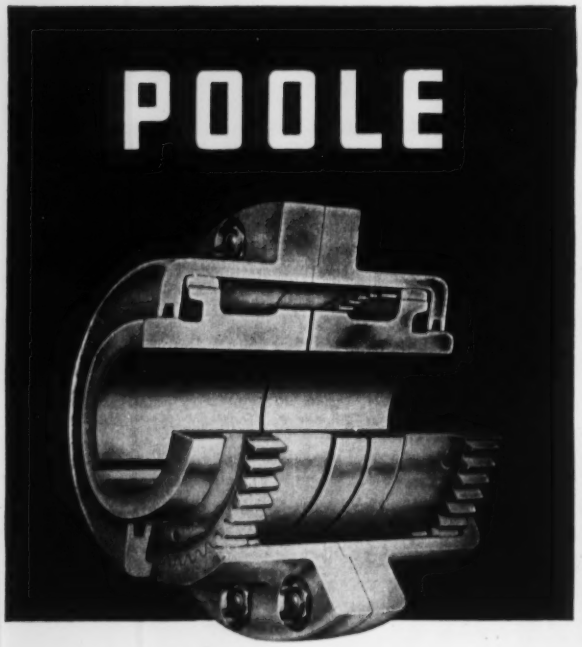
Size for size, Cone-Drive speed reducers will out perform any other worm geared speed reducer on the market. Yet, you can select any one of 190,000 standard stock reducers to meet your specific drive problem.

Ratios from 5:1 to 4900:1.
Loads from fractional to 800 HP.
Only 58 standardized mountings.

You can see how almost 100 manufacturers are now using Cone-Drive gears. Ask for Bulletin CD-173.

CONE-DRIVE GEARS
Division, Michigan Tool Company
DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS
7171 E. McNichols Road • Detroit 12, Michigan

POOLE



A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

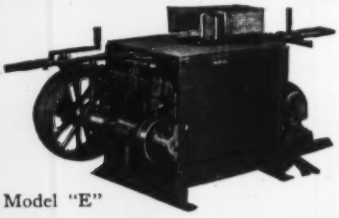
FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

KARDONG STIRRUP BENDER

For Concrete Reinforcing Bars

This bender is the result of our 30 years experience in the manufacture of reinforcing bar benders. One man can easily bend 300 four bend stirrups an hour. This bender is also a very practical bender for light slab bars and miscellaneous bending. Write for catalog of our complete line of reinforcing bar benders.



Model "E"

KARDONG BROTHERS, INC.
MINNEAPOLIS 13, MINN.

Versatility counts in
HOT DIP GALVANIZING
any size or shape product, any size
order from the smallest to the largest

Excellent facilities for pickling and oiling

ENTERPRISE
GALVANIZING COMPANY
2523 E. Cumberland Street Philadelphia 25, Pa.

Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)...nom.	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$25.00-$26.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1 nom.	$40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

(Rail nearest seller)

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$3.35-$3.85
60-65%	4.00-4.35

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $114; Salina, Pa., $119; Niles, O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa., $130.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O. $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Perla, Ark., $109; Los Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Reesdale, Pa., $183.50; Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¼-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	26.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net ton, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5⅛	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18, 20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

For Stampings

...look for the PLUS

beyond

the PRICE!

Ever think what it costs when the stampings you ordered keep falling below your specified AQL?

Steady unvarying conformance with AQL requirements, with minimum rejects – established over an excellent 39-year record – is just one of many plusses you get when you buy Detroit Stampings.

Look for the Plusses *beyond* the price the next time you buy stampings!

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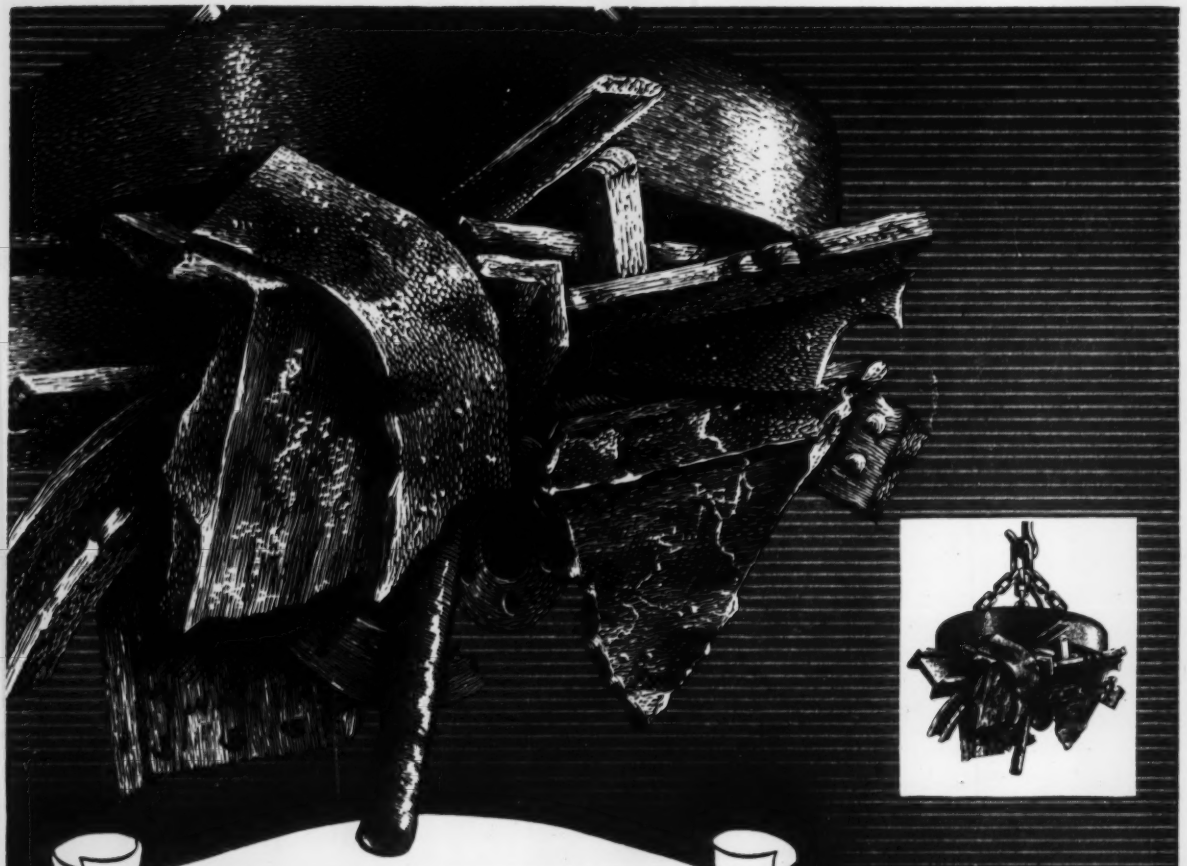
DETROIT STAMPING COMPANY

DE-STA-CO

359 Midland Ave., Detroit 3, Mich.

"America's Best-Known Jobbing Stampings Manufacturer"



A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

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Philadelphia 7, Penna.

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EXPORTS-IMPORTS — LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

Scrap . . .

Scrap Prices, Page 220

Pittsburgh—Prices on No. 1 heavy melting and No. 1 bundles dropped $1 a ton last week on the basis of a small sale. No increase in scrap use is likely in December in this area. Cast iron grades are particularly dull, and prices generally are off $1. Increase in price of nickel contributed to higher quotations for stainless steel scrap last week. Prices increased about $5 a ton.

Philadelphia—Scrap prices are fairly steady. No. 2 bundles are a shade easier at $26.50 to $27, delivered. So are structurals and plate at $34.50 to $35 and No. 1 cupola at $35. All other grades are unchanged.

Considerable steel scrap is still moving for export. But the pressure from abroad is not quite what it was earlier this fall.

New York—Brokers have reduced buying prices on No. 2 bundles to a spread of $20 to $21, on unstripped motor blocks, $22 to $23. Otherwise, the market is firm.

With the recent lifting of the embargo at Jersey City docks, scrap is again moving abroad more freely.

Establishment and enforcement of a program to improve the quality of scrap will be the chief business before the first annual meeting of the National Federation of Independent Scrap Yard Dealers Inc. Dec. 12 at Hotel Roosevelt here.

Buffalo—Despite district steel production at 100 per cent of capacity, bullish sentiment in the local scrap market was jolted as the area's leading mill consumer placed substantial orders for steelmaking grades at $1 per ton under prevailing prices. Dealers were influenced to lower prices by recent receipts from the Detroit area. But efforts to obtain turnings at lower prices proved futile.

Cleveland—Trading in steelmaking grades of scrap is at a virtual standstill both here and in the Valley, but prices are holding unchanged. Small tonnages of blast furnace grades sold last week at unchanged prices.

Detroit—Turnings and the No. 2 open hearth grades display a little softness, but the No. 1 grades of steelmaking scrap continue strong.

Chicago—The scrap market is quiet and lacking price test. There have been no sales of consequence recently, but steelmaking grades of industrial origin move under contract at established prices. Dealer material isn't moving well. Noteworthy are reported small sales of dealer No. 1 heavy melting at $33, or $1 below industrial scrap.

St. Louis—Scrap shipments into this district are heavier in response to the slight price boost by dealers a month ago. Mills are taking all dealer offerings but pressure for lower prices is intense.

One steelworks will be out of the market this month.

Seattle—Steel scrap is firm at $27 and $23 for No. 1 and No. 2 heavy melting, respectively. Supplies are adequate, but there is no surplus. Mills are well stocked and anticipate no supply difficulty over the winter. Cast iron is in good supply.

Birmingham—The district's scrap market has shown little activity over the past two weeks except for continued heavy movement of export tonnage. Receipt of scrap at local yards is only moderate.

Structural Shapes . . .

Structural Shape Prices, Page 202

October bookings of fabricated structural steel amounted to 206,761 tons, practically the same as in September and 8 per cent greater than for the corresponding month of last year, reports the American Institute of Steel Construction. In September bookings totaled 206,606 tons.

Bookings for the first 10 months amounted to 2,110,764 tons, against 2,428,850 in the like period last year.

(*Please turn to page* 222)

The world's best . . . one-piece, drop forged—not welded—of mild carbon steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines. Integral washer and nut. Sizes: up to 30". Typical direct prices for 10" lengths: ½—$1.36; ⅝—$1.36; ¾—$1.58; ⅞—$1.89. Write for price list.

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Dec. 1	$32.58
Nov. 24	33.08
Nov. Avg.	33.29
Dec. 1953	39.69
Dec. 1949	28.03

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	28.00-29.00
No. 2 bundles	26.00-27.00
No. 1 bundles	*32.00-33.00*
No. 1 busheling	32.00-33.00
Machine shop turnings	*18.00-19.00*
Mixed borings, turnings	*18.00-19.00*
Short shovel turnings	*22.00-23.00*
Cast iron borings	*22.00-23.00*
Cut structurals, 5 ft lengths	35.00-36.00
Heavy turnings	*29.00-30.00*
Punchings & plate scrap	36.00-37.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Charging box cast	*31.00-32.00*
Heavy breakable cast	*30.00-31.00*
Unstripped motor blocks	*22.00-23.00*
No. 1 machinery cast	*41.00-42.00*

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 2-ft and under	45.00-46.00
Rails, 18-in. and under	46.00-47.00
Rails, random lengths	39.00-40.00
Railroad specialties	37.50-38.50

Stainless Steel Scrap

18-8 bundles & solids	*185.00-195.00*
18-8 turnings	*90.00-95.00*
430 bundles & solids	*75.00-80.00*
430 turnings	*60.00-62.00*

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	32.00-33.00
No. 2 bundles	24.00-25.00
No. 1 busheling	32.00-33.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	34.00-35.00
Cut structural plate 2 ft and under	38.00-39.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Stove plate	38.00-39.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	30.00-31.00
Brake shoes	31.00-32.00
Clean auto cast	44.00-45.00
No. 1 wheels	37.00-38.00
Burnt cast	29.00-30.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	44.00-45.00
Rails, 3-ft and under	47.00-48.00
Rails, 18 in. and under	48.00-49.00
Rails, random lengths	44.00-45.00
Cast steel	36.00-37.00
Railroad specialties	36.00-37.00
Uncut tires	37.00-38.00
Angles, splice bars	43.00-44.00
Rails, rerolling	52.00-53.00

Stainless Steel (Brokers' Buying Prices)

18-8 bundles, solids	175.00-180.00
18-8 turnings	70.00-80.00
430 clips, bundles, solids	70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	34.00-35.00
No. 2 bundles	26.00-27.00
Machine shop turnings	14.00-15.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	36.00-37.00
Electric furnace bundles	*35.00-36.00*

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00

CHICAGO

No. 1 heavy melting	*32.00-34.00*
No. 2 heavy melting	30.00-31.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	32.00-33.00
No. 2 bundles	23.00-24.00
No. 1 busheling	*32.00-34.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 3-ft	*36.00-37.00*
Punchings & plate scrap	*36.00-37.00*
Electric furnace bundles	*35.00-36.00*

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	32.00-33.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	42.00-43.00
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt	*36.00-37.00*
R.R. malleable	42.00-44.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Angles, splice bars	43.00-44.00
Rails, rerolling	*52.00-53.00*

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	75.00-80.00
430 bundles & solids	65.00-70.00
430 turnings	30.00-40.00

Chicago Mercantile Exchange

No. 1 Heavy Melting
(Week ended Dec. 1)

	High	Low	Close
Jan.	*35.75*	*35.25*	*35.25**
Mar.	*36.75*	*36.50*	*36.75*

Sales (40-ton units): 2 January; 1 March. *Nominal.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	27.00
No. 2 heavy melting	*19.00*
No. 1 bundles	28.00
No. 2 bundles	*19.00*
No. 1 busheling	27.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	14.00
Punching & plate scrap	28.50

Cast Iron Grades

No. 1 cupola	34.00
Charging box cast	27.00
Stove plate	30.00
Heavy breakable	25.00
Unstripped motor blocks	20.00
Clean auto cast	38.00
Malleable	30.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	30.00-31.00
No. 2 bundles	21.00-22.00
No. 1 busheling	30.00-31.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Low phos. 18-in.	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	36.00
Charging box cast	36.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18-in. and under	47.00-48.00
Rails, random lengths	39.00-40.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	32.00-32.50
No. 2 heavy melting	*26.50-27.00*
No. 1 bundles	32.00-32.50
No. 2 bundles	26.50-27.50
No. 1 busheling	30.50-31.50
Electric furnace bundles	33.50
Machine shop turnings	19.00-19.50
Mixed borings, turnings	19.00-19.50
Short shovel turnings	21.00-22.00
Structurals & plate	*34.50-35.00*
Heavy turnings	30.00-31.00
Couplers, springs, wheels	35.00
Rails crop, 2 ft & under	46.00

Cast Iron Grades

No. 1 cupola	*35.00*
Malleable	43.00
Heavy breakable cast	36.00-36.50
Drop broken machinery	42.00-43.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	27.00-28.00
No. 2 bundles	*20.00-21.00*
Machine shop turnings	10.00-11.00
Mixed borings, short turnings	11.00-12.00
Low phos. (structural & plate)	29.00-30.00
Short shovel turnings	12.50-13.50

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	*22.00-23.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	50.00
410 sheets, clips, solids	40.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	22.00-24.50
No. 2 heavy melting	18.25-19.50
No. 1 bundles	23.00-25.00
No. 2 bundles	16.50-17.00
Mixed borings, turnings	10.00-10.50
Machine shop turnings	*8.00-8.50*
Short shovel turnings	*11.00-11.50*
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

BUFFALO

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*27.50-28.50*
No. 1 bundles	*30.00-31.00*
No. 2 bundles	*25.50-26.50*
No. 1 busheling	*30.00-31.00*
Machine shop turnings	18.00-19.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	21.00-22.00
Cast iron borings	20.00-21.00
Low phos.	*33.00-34.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	35.00-36.00
Rails, 3 ft and under	42.00-43.00
Railroad specialties	36.50-37.50

BIRMINGHAM

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	23.00-24.00
No. 2 bundles	19.00-20.00
Cast iron borings	16.00-17.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	29.00-30.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	33.00-34.00
Structural plate, 2 ft	33.00-34.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	40.00-41.00
Angles, splice bars	38.00-39.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	30.00
No. 2 heavy melting	28.00
No. 1 bundles	30.00
No. 2 bundles	*25.75*
Machine shop turnings	13.00
Short shovel turnings	15.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	*32.50*
Heavy breakable cast	*32.50*
Unstripped motor blocks	*32.50*
Brake shoes	30.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt	35.00
Rails, 18-in. and under	46.00
Rails, random lengths	*43.00-45.00*
Rail, rerolling	*51.00-52.00*
Angles, splice bars	*40.00-41.00*

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	27.00
No. 2 heavy melting	23.00
No. 1 bundles	21.00
No. 2 bundles	17.00
No. 3 bundles	13.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	12.00
Electric furnace, No. 1	32.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	32.00-35.00
Heavy breakable cast	23.00
Unstripped motor blocks	25.00
No. 1 wheels	21.00
Stove plate(f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap (Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	5.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	18.00
No. 1 busheling	24.00
Machine shop turnings	6.00
Mixed borings, turnings	6.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	43.00-46.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

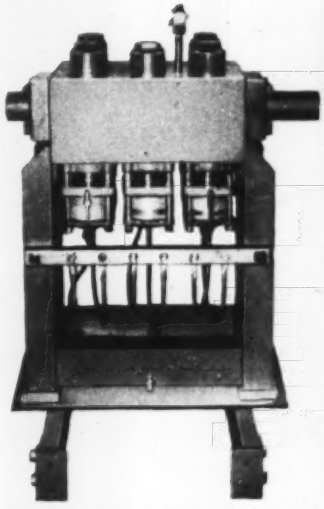
(Delivered prices)

No. 1 heavy melting	26.00
No. 2 heavy melting	23.00
No. 1 bundles	26.00
No. 2 bundles	21.00
Mixed steel scrap	20.00
Mixed borings, turnings	12.00
Rails, remelting	35.00
Busheling, new factory: Prepared	24.00
Unprepared	20.00
Short steel turnings	12.00

Cast Iron Grades†

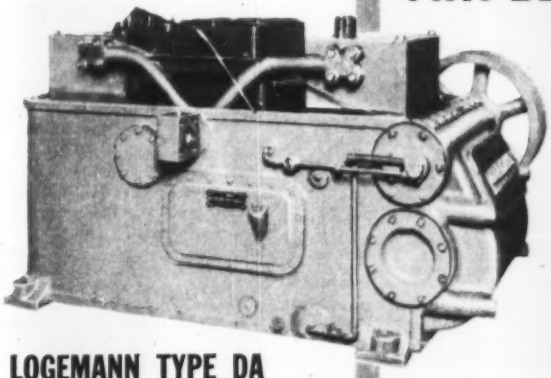
No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.



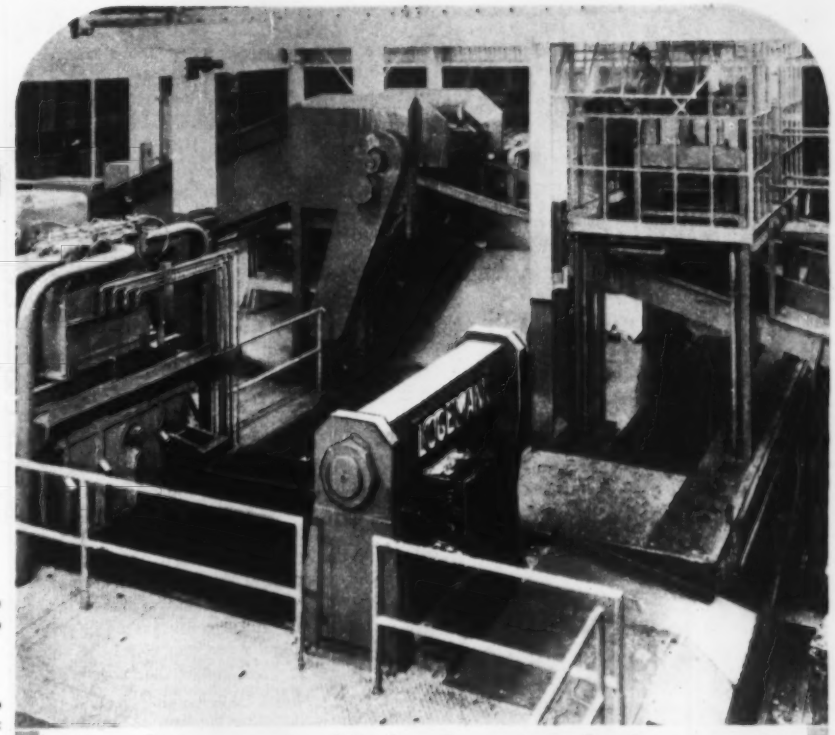
LOGEMANN HYDRAULIC OPERATING VALVE

This compact valve was designed to control the movements of the hydraulic rams in large scrap presses but can be modified to suit similar operations on other hydraulic equipment. Interested parties will please outline the nature of the service, operating sequence, gallonage and pressure requirements.



LOGEMANN TYPE DA DOUBLE PRESSURE PUMPS

These compact and efficient opposed-cylinder reciprocating-plunger pumps for low and high pressure service lend themselves to a wide range of double pressure applications. They are close-coupled, reliable, and capable of delivering high gallonage, at low and high pressures, at low power costs.



Get low cost, high density bales with LOGEMANN SELF-CONTAINED TRIPLE-COMPRESSION PRESSES

The illustration shows one of two large scrap-press units in a modern automotive plant. Over a period of many years, such units have baled sheet scrap skeletons and trim from metal operations in large industrial plants throughout the country, forming the scrap into high-density bales for re-melting in steel mills. Low baling costs are the result of correct design for heavy duty service, minimum maintenance and operating interruptions, as well as simplicity, accessibility and safety features.

Pioneers in the metal baling field, LOGEMANN engineers embodied in the design those features that have proven dependable over an extended period of years. Some installations in service over 35 years are still operating economically.

Tell Us the nature of your scrap!

LOGEMANN press sizes are not confined to the large models. Producers of sheet scrap—steel, copper, brass, or aluminum—are invited to submit their scrap baling problems regardless of tonnage. Please state the character of the metal, minimum tonnage to be handled in a given period of hours, range of gauges and, where possible, indicate maximum and minimum lengths and widths of pieces. Experienced sales engineers are available for discussion of your conditions and requirements.

LOGEMANN BROTHERS CO.

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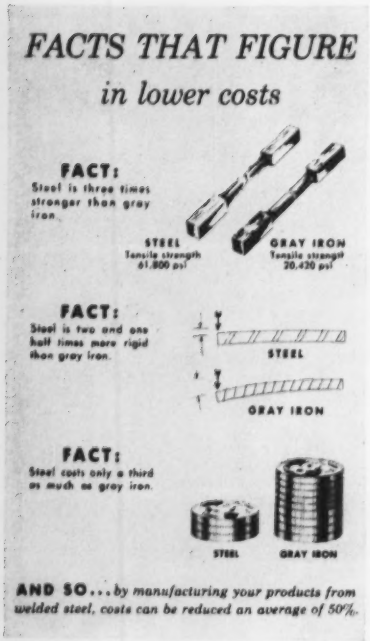
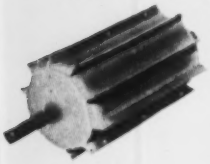

FACTS THAT FIGURE
in lower costs
FACT:
Steel is three times stronger than gray iron.
STEEL
Tensile strength 61,800 psi
GRAY IRON
Tensile strength 20,420 psi
FACT:
Steel is two and one half times more rigid than gray iron.
STEEL
GRAY IRON
FACT:
Steel costs only a third as much as gray iron.
STEEL
GRAY IRON
AND SO... by manufacturing your products from welded steel, costs can be reduced an average of 50%.

HOW YOU CAN CUT COSTS...NOW

BECAUSE steel is stronger, more rigid than iron, yet costs a third as much per pound, costs on many products can be cut up to 50%.

Savings like this can be realized on *your* products without disrupting production. Simply change over your designs one part at a time.

COSTS 45% LESS



Feeder roll is built from standard channel welded to steel discs. Steel design eliminates breakage, weighs half of former casting. Saves 45% on cost of manufacture.

COSTS 30% LESS

Machine bracket is welded from 10 gauge metal. Weighs half as much as original cast design. Costs 30% less to produce.

A Lincoln representative will gladly work with you to cut your production time. He can show you how to simplify design details . . . cut costly man-hours. Call him or write on your letterhead.

THE LINCOLN ELECTRIC COMPANY
Dept. 1613, Cleveland 17, Ohio
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

(Concluded from page 219)

October shipments were 254,507 tons, a drop of 4 per cent from the preceding month when 265,388 tons were moved. Shipments for the first 10 months totaled 2,679,348 tons, 3 per cent better than the 2,592,941 tons in the like period of 1953.

Order backlogs, as of Oct. 31, stood at 1,293,779 tons.

Despite seasonal slackening in construction, with an attendant slump in structural steel demand, there still is considerable steel coming up for bids—principally for highway bridges and other types of public work. Even this latter type of work, however, is less active, largely because of expiring budgets and the approach of winter weather.

Most fabricators are reported holding comfortable backlogs. Bridge work is especially prominent at present. Several thousand tons are scheduled for early bidding and a new sizable volume of New York state bridge work is coming out for bids Dec. 23. An outstanding inquiry involves 4650 tons for a bridge over the St. Lawrence river for the Power Authority of the State of New York.

Miscellaneous construction is holding up fairly well, considering the season, but competition among fabricators is increasingly keen.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1750 tons, grade crossing elimination, Winchester, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh, through C. J. Maney & Co., Lexington, Mass., general contractors.

1300 tons, high school, Abington, Pa., to Belmont Iron Works, Eddystone, Pa.

925 tons, six state bridges, Revere Beach parkway, Everett, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh, through Gil Wyner & Co., Inc., Malden, Mass., general contractors.

670 tons, additional facilities, medical center, Portland, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me., through John A. Volpe Construction Co., Malden, Mass., general contractor.

218 tons, Shoreline High School, Seattle, to Isaacson Iron Works, Seattle.

140 tons, bridge, Pine Point crossing, Boston & Maine railroad, state route 9, Scarboro, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Frank Rossi, Gardiner, Me., general contractor.

100 tons or more, warehouse, Jordan Marsh Co., Newton, Mass., to A. O. Wilson Structural Co., Cambridge, Mass., through George B. H. Macomber Co., Boston, general contractor.

100 tons, addition to terminal, Shell Oil Co., to Pacific Car & Foundry Co., Seattle.

STRUCTURAL STEEL PENDING

10,025 tons, including 1850 tons of structural silicon steel, superstructure, east viaduct, contract N-22, Jersey City, N. J.; New Jersey Turnpike Authority, New Brunswick, N. J., opens bids Dec. 28; also required are 9480 feet of metal railing.

4650 tons, Barnhart island bridge, over the St. Lawrence river, near Massena, N.Y., bids close Dec. 7 by the Power Authority of the State of New York, 270 Broadway, New York.

2870 tons, state viaducts, Allegheny county, Pa., bids Dec. 21.

2500 tons, state office building, Harrisburg, Pa., bids Dec. 15.

2500 tons, viaduct, Northeast expressway, con-

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OTTAWA STEEL PRODUCTS INC.
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BOSTON: Hotel Somerset
NEW YORK CITY: Ritz Tower Hotel
CLEVELAND: Hotel Cleveland

tract two, Chelsea, Mass.; Coleman Bros. Corp., Boston, low on general contract.

2000 tons, state office building, Pittsburgh, bids Dec. 22.

1560 tons, bridges, Porter county, Indiana; bids Dec. 8, Indiana Toll Road Commission, Indianapolis, contracts C-15 and C-16.

1500 tons, grade crossing elimination, New York, New Haven & Hartford, Mansfield, Mass.; Westcott Construction Co., North Attleboro, Mass., low on general contract.

800 tons, state bridge, Bladensburg, Md.; bids closed Nov. 30.

500 tons, foundry building, Chambersburg Engineering Co., Chambersburg, Pa.

250 tons, Navy hangar, Willow Grove, Pa.; bids postponed indefinitely.

228 tons, state bridge work, Bergen county and Passaic county, New Jersey, bids Dec. 14; also 115 tons of reinforcing steel.

150 tons, two small hangars, McChord Air Field, Washington state; bids in to U. S. Engineer, Seattle, Nov. 26.

100 tons or more, four steel picket hangars, 19,000 sq ft, Great Falls, Mont., air base; bids to U. S. Engineer, Seattle, about Jan. 4; spec. No. 55-85.

REINFORCING BARS . . .

REINFORCING BARS PLACED

515 tons, superstructures for five bridges, contract N-15, Jersey City, N. J., awarded by New Jersey Turnpike Authority, New Brunswick, N. J., to American Bridge Division, U. S. Steel Corp., Pittsburgh; bids on 60,000 feet of steel piles for these bridges will be opened Dec. 30 by the Turnpike Authority.

350 tons, law school building, Howard University, Washington, D. C., to Bethlehem Steel Co., Bethlehem, Pa., through John A. Volpe Construction Co., Washington.

305 tons, Meadowbrook Junior High School, Newton Highlands, Mass., to Northern Steel Inc., Medford, Mass. through Wesler Construction Co., Newton Highlands; 70 tons of structurals to Arc-Way Ornamental Iron Co., Boston.

220 tons, additional facilities, medical center, Portland, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me., through John A. Volpe Construction Co., Malden, Mass., general contractor.

175 tons, building, State Youth Service Board, Dorchester, Mass., to Barker Steel Co., Boston, through G. L. Rugo & Sons Inc., Boston, general contractor; 60 tons of structurals to Hule Steel & Iron Works, Boston.

REINFORCING BARS PENDING

1005 tons, bridges, Porter county, Indiana; bids Dec. 8, Indiana Toll Road Commission, Indianapolis, contracts C-15 and C-16.

750 tons, construction of abutments and piers for southeast viaduct, contract N-13, Jersey City, N. J.; New Jersey Turnpike Authority, New Brunswick, N. J., opens bids Dec. 28; 5200 feet of steel piles also required.

472 tons, state viaducts, Allegheny county, Pa., bids Dec. 21; also, 2870 tons of structurals.

350 tons, two dormitories, Seattle University; general contract to John H. Sellen Construction Co., Seattle.

140 tons, also shapes and pipe, Glacier National Park, Montana; bids in second quarter 1955, to Bureau of Public Roads, Columbia Falls, Mont.

115 tons, state bridge work, Bergen and Passaic counties, New Jersey, bids Dec. 14; also 228 tons of structural steel.

PLATES . . .

PLATES PLACED

60 tons, elevated steel water tank, district No. 58, Seattle, to Chicago Bridge & Iron Co., Seattle.

PLATES PENDING

1000 tons, storage tanks, Greater Baton Rouge Port Commission, Baton Rouge, La., to Chicago Bridge & Iron Co., Houston, Tex.

100 tons plus, 750,000-gal elevated steel water tank; bids to R. G. Lovette, city clerk, Vancouver, Wash., Dec. 20.

PIPE . . .

STEEL PIPE PENDING

400 tons, various sizes, light gage wrapped, Fairbanks, Alaska, system expansion; Peter Kiewit Sons Co., Seattle, general contractor.

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Take advantage of our more than 40 years' experience in manufacturing and re-building industrial transformers. Complete satisfaction guaranteed.

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Help Wanted

IGNITRON ENGINEER CALIFORNIA B.S. or M.S. in E.E., U. S. citizen, with interest in and preferably experience with pumped-down Ignitron rectifier-inverters. Will assume part responsibility for magnet power supply on new Bevatron, world's largest particle accelerator. Excellent opportunity to work alongside fundamental nuclear research. Twenty minutes from metropolitan San Francisco. Salary open. Professional Personnel Office, University of California Radiation Laboratory, Berkeley 4, California.

SALES ENGINEER for large eastern steel plate fabricator. Must be thoroughly versed in all phases of Process Equipment such as Towers, Condensers, Autoclaves, Pipe fabrication, etc., both in steel and the alloys. Will operate out of metropolitan New York office and be willing to travel. Must have well-established reputation and reasonable following in the field. Salary Open. Reply Box 170, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

EXPERIENCED FORGING ENGINEER AVAILABLE. Expert in hand tools and railroad work, production, design and management. Willing to travel. Passport in order. Reply Box 145, STEEL, Penton Building, Cleveland 13, Ohio.

FORGING ENGINEER WITH MANAGEMENT EXPERIENCE AVAILABLE FOR RESPONSIBLE POSITION WITH SMALL OR MEDIUM SIZED DROP FORGE SHOP. REPLY BOX 171, STEEL, PENTON BUILDING, CLEVELAND 13, OHIO.

STEEL METALLURGIST. Management, engineering and consulting experience in melting, rolling and heat treating operations in U. S. and abroad. Reply Box 172, STEEL, Penton Building, Cleveland 13, Ohio.

EXECUTIVE ENGINEER raw materials, assistant or sales. Age 40. Well trained technically, 14 years varied experience blast furnace, open hearth and sinter. Presently Assistant Superintendent blast furnaces. Seeking top level contact. Can you use this experience? Reply Box 174, STEEL, Penton Building, Cleveland 13, Ohio.

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For small long-established Forging Plant in Akron, Ohio. Prefer man who has a good knowledge of Small Upsetters (2" sizes), Drop Hammers (3000 lbs), Maxi Presses, Punch Press, Tool and dies, etc. Plant manufactures nationally known line of Mechanic Hand Tools.

If you have proven supervisory and management ability in directing a working force of approximately 50 people, write stating full particulars, salary expected, etc.

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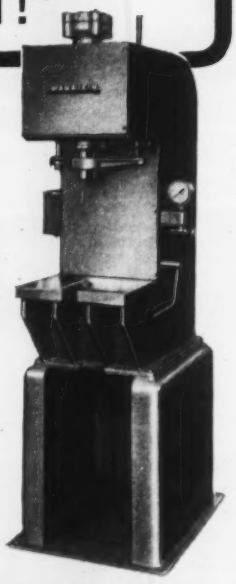

That's the price of this 5-Ton HANNIFIN Press*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

WRITE. Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

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Increase Storage Capacity with a C-F Lifter

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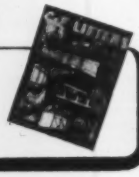

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The pinion gear window regulators shown above were made from Republic Cold Drawn Special Sections. They were made at less cost because much of the machining was eliminated.

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Your parts also benefit from the increased physicals produced by cold drawing. It gives them higher strength, greater hardness and a bright smooth finish that rarely requires further finishing.

Large tonnage requirements are not necessary, but they do result in greater economies. We can produce cold drawn sections in large or small quantities to meet your requirements. Sections can be produced in a wide variety of analyses. Possibilities for variation in contour are almost limitless.

A Republic representative will be happy to call at your plant. Or send us samples or blueprints of your parts. We will tell you promptly and impartially whether the nature of your parts would make the use of Republic Union Drawn Special Sections efficient and economical.

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REPUBLIC *Union*

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COLD DRAWN STEELS

These sample shapes are only a few of thousands produced by Republic. They may give you an idea on how you can use Republic Cold Drawn Special Sections for your product.

RECENT LARGE INSTALLATIONS INDICATE SINGLE STACK ANNEALING HAS COME OF AGE

In the last two years Single Stack annealing has grown up. The proof — the largest new furnace orders during this period have been predominantly Single Stack.

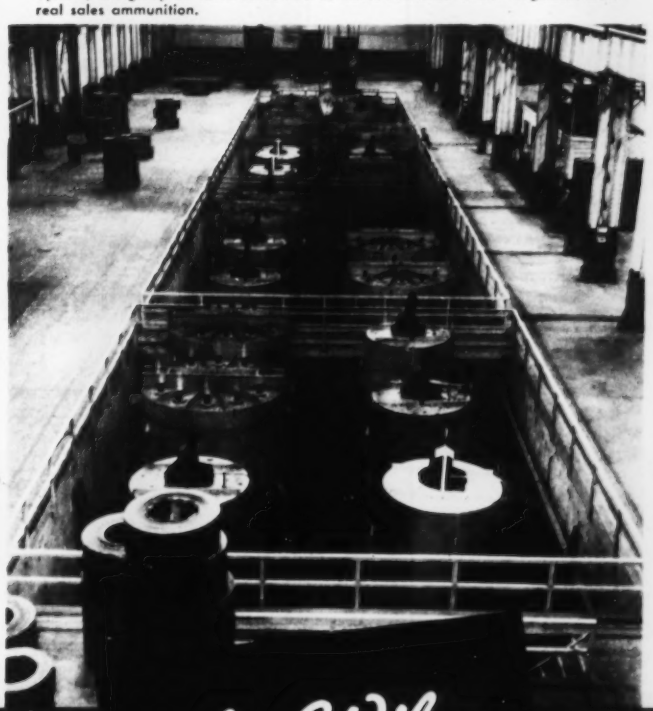
The reasons are many. Single Stack furnaces give producers tremendous flexibility in their annealing operation. The operation is based on single units — not multiples. Thus, when one base is loaded it can be set to work. No waiting. And, by the discriminate grouping of similar sized coils on individual bases, annealing cycles can be adjusted to charge requirements. In many instances base operating time can be shortened and the base freed to receive another charge.

Single Stack furnaces heat up faster and, because the heating tubes are equidistant from all points of the charge, Single Stack furnaces apply a more uniform heat. This means much closer control is possible.

Lee Wilson developed the radiant tube method of annealing, has perfected the Single Stack system and has brought it into prominence through such innovations as the highly efficient "O" type heating tube and the portable base which eliminates the need for expensive basements and understructures.

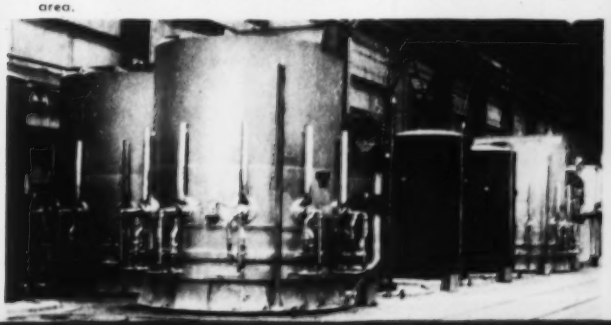
In fact, Lee Wilson is the largest designer and builder of modern Single Stack annealing equipment, so when next you're talking annealing make sure you have all the facts. Contact Lee Wilson Engineering and make arrangements to have a Single Stack expert at your office at your convenience. There are brochures and data sheets available upon request.

One of the first complete installations of the Lee Wilson Single-Stack Annealing System, this group of 12 furnaces and 30 bases furnished Wilson engineers with real sales ammunition.



In the process of completion is this large Midwestern installation of Lee Wilson Single-Stack equipment. It is composed of 12 furnaces and 36 bases. It will take charges up to 72 x 156 inches.

Efficiency of the Single-Stack was proved at this installation in a Southern plant. Here five furnaces and 16 bases doubled production of annealing area.



Lee Wilson ENGINEERING COMPANY, Inc.

20005 WEST LAKE ROAD
CLEVELAND 16, OHIO

Records shattered! TIMKEN® bearings hit 8 million ton mark on this plate mill

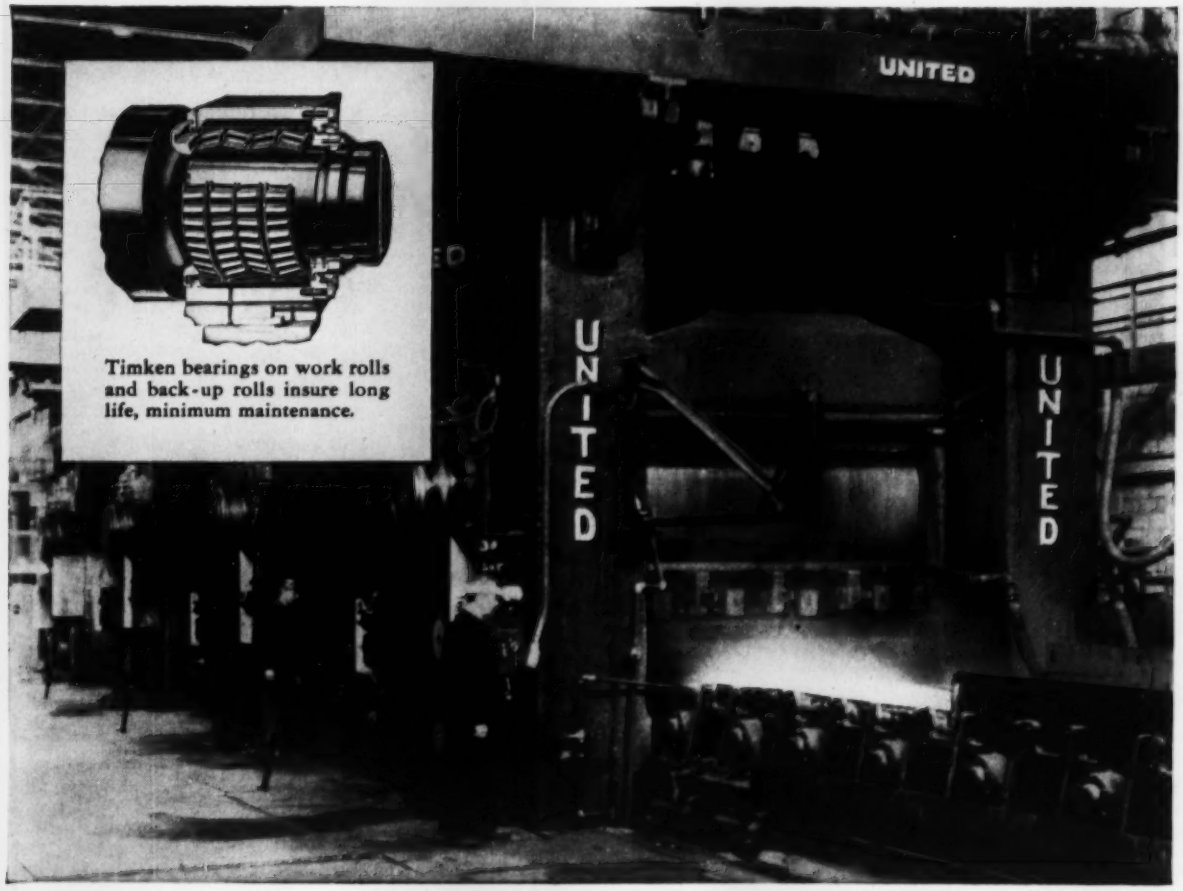
THE 31 Timken® tapered roller bearings on this United semi-continuous plate mill at U. S. Steel's Homestead Works have now rolled an average of 5 million tons. And some of the Timken bearings have rolled over *eight million tons!*

One reason for this remarkable record is the high load capacity of Timken bearings. They carry the load on full lines of contact between races and rollers. A second reason is the extremely low frictional resistance of Timken bearings. They are geometrically designed to have true rolling motion and are manufactured to live up to this design.

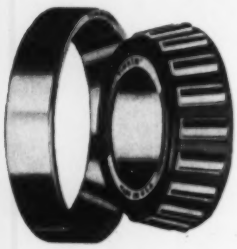
The design of rolling mills is simplified with Timken bearings because no extra thrust devices are required. Timken bearings take both radial and thrust loads. Thus chuck mountings are simpler and more compact. Timken bearings greatly simplify lubrication because they use grease—no tubes, pipes or reservoirs are needed.

Timken bearings make all kinds of machinery run better and last longer. When you buy or build machinery always look for the trademark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



Timken bearings on work rolls and back-up rolls insure long life, minimum maintenance.



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MAGNIFYING GLASS INSPECTION OF EVERY ROLLER!

Every one of the over one billion Timken bearing rollers produced every year is inspected with powerful magnifying glasses to detect surface flaws. It's just one example of how the Timken Company insures uniform high quality.